

## 1. Modeling channel architecture in a densely drilled oilfield in East China

Wang, J. (1); MacDonald, A.C. (1)

**Source:** *Proceedings - SPE Annual Technical Conference and Exhibition*, v Omega, n Pt 1, p 365-372, 1997, *Formation Evaluation and Reservoir Geology*; **DOI:** 10.2118/38678-ms; **Conference:** Proceedings of the 1997 SPE Annual Technical Conference and Exhibition. Part Omega (pt 1), October 5, 1997 - October 8, 1997; **Publisher:** Society of Petroleum Engineers (SPE)

**Author affiliation:** (1) Xian Petroleum Inst, China

**Abstract:** An 'object-type' stochastic model has been used to describe channel architecture within a densely drilled onshore field in East China (Gudong Field). The Gudong dataset comprises 75 wells which are drilled in a regular pattern at a spacing of down to 150 m. The modeled reservoir is 43 m thick with an average net:gross of 0.29. There are 144 observations of channel sandbodies in the 75 wells. The model can simulate channel architectures in the Gudong Field where the average channel width is similar to the well spacing within the most densely drilled part of the field (150 m). The study has demonstrated that 'object-type' models can be applied to mature fields with a large number of wells. The key to the conditioning of object models is a correct use of the well data, and enough flexibility in the model to capture complex, realistic geometries. (15 refs)

**Main heading:** Petroleum reservoir evaluation

**Controlled terms:** Mathematical models - Oil well drilling - Petroleum reservoirs - Statistical methods

**Uncontrolled terms:** Channel architecture - Stochastic models

**Classification Code:** 512.1.2 Petroleum Deposits : Development Operations - 922.2 Mathematical Statistics

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 2. Investigation on the relations among fractal dimension, viscosity ratio and sweep efficiency of viscous fingering

Zhang, Jianhua ; Liu, Zhenhua

**Source:** *Shiyou Xuebao/Acta Petrolei Sinica*, v 18, n 1, p 86-90, Jan 1997; **Language:** Chinese; **ISSN:** 02532697

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 3. Digital simulation for system reliability analysis of air balanced pumping unit

Zhu, Xiaoping

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 8, p 31-34, Aug 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

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## 4. Reverse circulation well control method and its calculation in slim hole

Xu, Huayi ; Yu, Zhiqing

**Source:** *Shi You Zuan Cai Gong Yi/Oil Drilling and Production Technology*, v 19, n 6, p 10-15, 1997; **Language:** Chinese; **ISSN:** 10007393

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 5. Numerical inversion of Laplace transform solutions in dynamics of porous flow

He, Guangyu

**Source:** *Ying Yong Li Xue Xue Bao/Chinese Journal of Applied Mechanics*, v 14, n 1, p 113-117, Mar 30 1997;

**Language:** Chinese; **ISSN:** 10004939

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 6. Application of microwave to the exploitation of oil and gas

Ma, Baoqi ; Ni, Binghua

**Source:** *Shiyou Kan Tan Yu Kai Fa/Petroleum Exploration and Development*, v 24, n 3, p 57-60, June 1997;

**Language:** Chinese; **ISSN:** 10000747

**Database:** Compendex

**Data Provider:** Engineering Village

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## 7. Study on the test method of a new characteristic parameter VGC describing the fracture toughness of materials

Tian, Meie

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 39-42, 54, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** This paper introduces a new characteristic parameter VGC (critical void growth ratio) describing the fracture toughness of materials and the fracture criterion corresponding to it. The VGC of pressure vessel steel WH530 and aluminium alloy 7475 was measured with the test method preliminarily worked out. The test result shows that the difference exists between the results measured by different observers. The author analyses the cause resulting in the difference, and proposes a improved test method - multiple loading method. The accuracy of VGC measured with the improved method can be greatly increased, and the difference hardly exists.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 8. Investment model on high new technology projects

Zhang, Zhiyong ; Gao, Yanyun

**Source:** *Xitong Gongcheng Lilun yu Shijian/System Engineering Theory and Practice*, v 17, n 3, p 83-86, Mar 1997;

**Language:** Chinese; **ISSN:** 10006788

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 9. Application of method for calculating inertia moment of rotating parts on drilling rig by computer

Chen, Chaoda ; Hu, Zaiying

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 11, p 8-10, 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 10. Automatic detection of cracks on ferromagnetic rods with rough surfaces

Yu, Min

**Source:** *Wusun Jiance/Nondestructive Testing*, v 19, n 7, p 186-187, July 1997; **Language:** Chinese; **ISSN:** 10006656

**Database:** Compendex

**Data Provider:** Engineering Village

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## 11. Study on the penetration mechanism and trajectory of projectile and rocket penetrators into soil and rock

Zhang, Ruiping

**Source:** *Binggong Xuebao/Acta Armamentarii*, v 18, n 3, p 212-216, Aug 1997; **Language:** Chinese; **ISSN:** 10001093

**Abstract:** The penetration mechanism of projectiles and rocket penetrators into soil and rock is studied and analysed, using the cavity expansion theory. The corresponding calculation models of penetration trajectory are established.

Finally, the correctness of the models is verified by practical examples.

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 12. Correction of measurement error of welding stress by error curve method

Li, Dongcai ; Yuan, Haibin ; Zhou, Haobin ; Lu, Yanling

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 8, p 13-15, 26, Aug 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 13. Analysis rule processing method and its application in exact evaluation of oil-gas reservoirs by using of grey system theory

Song, Ziqi ; Tan, Chengqian

**Source:** *Xitong Gongcheng Lilun yu Shijian/System Engineering Theory and Practice*, v 17, n 3, p 74-82, Mar 1997;

**Language:** Chinese; **ISSN:** 10006788

**Database:** Compendex

**Data Provider:** Engineering Village

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## 14. Analysis of productivity formulae of horizontal well

Li, Dang ; Wang, Weihong ; Wang, Aihua

**Source:** *Shiyou Kan Tan Yu Kai Fa/Petroleum Exploration and Development*, v 24, n 5, p 76-79, 1997; **Language:** Chinese; **ISSN:** 10000747

**Database:** Compendex

**Data Provider:** Engineering Village

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## 15. Petroleum geologic features of Tarim Basin

Zhao, Jing-zhou

**Source:** *Journal of Engineering and Applied Science*, v 12, n 2, p 8-15, 1997; **ISSN:** 11101903; **Publisher:** Xi'an Petroleum Institute

**Abstract:** Tarim Basin is a superimposed and composite basin of numerous proto-type basins composed of the Paleozoic cratonic basins and Meso-Cenozoic foreland basins. It has undergone many tectonic movements and 7 evolutionary stages. Three major strata of source rocks are found-that is, the Cambrian-Ordovician, Carbonic-Permian and Triassic-Jurassic. Multiple and deep buried rich reservoir rocks are also developed together with 5 associated reservoir-cap rocks. The oil, gas and water are complicated in their properties and the oil/gas pools are rich and varied in their types. Both oil and gas are rich in this basin and the gas pools discovered are dominated by condensed gas. The oil and gas are not only of continental genesis but also of marine genesis; the oil pools are mainly of marine genesis, whereas the gas pools are mainly of continental genesis. Most of the pools are found to be middle to small sized and are characterized by deep burying, lower richness and high productivity. There are several petroleum systems in the basin and the pools formed in multiple ages; the oil and gas have experienced several times of migration and re-accumulation. Still, the distribution of oil and gas in Taim Basin is very complicated and is controlled by many factors, which increases the difficulty of petroleum exploration. (3 refs)

**Main heading:** Oil bearing formations

**Controlled terms:** Petroleum geology - Petroleum reservoirs - Tectonics - Rocks - Natural gas - Crude petroleum

**Uncontrolled terms:** Tarim basin - Source reservoir cap assemblage - Oil and gas reservoirs - Condensed gas - Marine genesis

**Classification Code:** 512.1.1 Oil Fields - 481.1 - 522 - 523

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 16. Reserve estimation by multiwell evaluation technique

Zhou, Ye ; Li, Huanpeng

**Source:** *Shiyou Xuebao/Acta Petrolei Sinica*, v 18, n 1, p 34-38, Jan 1997; **Language:** Chinese; **ISSN:** 02532697

**Database:** Compendex

**Data Provider:** Engineering Village

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## 17. Method for solving a special system of linear equation

Song, Julong ; Wang, Ling

**Source:** *Xi'an Dianzi Keji Daxue Xuebao/Journal of Xidian University*, v 24, n 4, p 535-538, 1997; **Language:** Chinese;

**ISSN:** 10012400

**Database:** Compendex

**Data Provider:** Engineering Village

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## 18. Productivity study on branch horizontal wells

Wang, Weihong ; Li, Dang

**Source:** *Shi You Zuan Cai Gong Yi/Oil Drilling and Production Technology*, v 19, n 4, p 53-57, Aug 1997; **Language:** Chinese; **ISSN:** 10007393

**Database:** Compendex

**Data Provider:** Engineering Village

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## 19. Analysis and improvement of OMNIPHONE - a three component digital geophone

Wang, Zhengyin

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 30-32, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** OMNIPHONE is an intelligent three component geophone with a microprocessor. It can attenuate surface wave with a polarization filter. This paper introduces OMNIPHONE and analyses its advantages. But it has also two disadvantages: (1) There is interference between two horizontal components (radial and tangential); (2) Two horizontal components can't effectively attenuate surface wave. For this reason, the authors analysed the software and hardware of OMNIPHONE, and found two drawbacks in them: (1) the phase differences caused by sampling time interval (250 microseconds) between three components increase with the increase of the frequencies of analysed signals; (2) in the software, there is a mistake of conversion from Gal' perin coordinate system to Cartesian coordinate system. After the mistake is corrected and the sampling time interval is reduced to 60 microseconds, the improved OMNIPHONE can effectively attenuate surface wave, the interference between two horizontal components is greatly decreased, and the frequency response curves of three components become more even.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 20. Effects of mechanical vibration on the capillary pressure curve and the wettability of a core

Yang, Ling

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 23-25, 35, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** The capillary pressure curves of cores before and after vibration are get with semipermeable membrane method, and the wettabilities with self-absorption method. The effect of vibration on the formation interface phenomena is studied by comparison. The mechanism of vibration increase productivity is also discussed in detail. By analysing the changes of the capillary pressure curves and the wettabilities, it is shown that the effects of vibration on the capillary pressure curve and the wettability of a core are greatest near its natural frequency, whose expression is that the pressure threshold value of the capillary pressure curve, the pressure at the intermediate value of saturation and the irreducible water saturation are all decrease; the wettability tends to water wet, and the absolute permeability increases. All the results are advantageous to increasing crude output and recovery efficiency.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 21. Study on the relation of fluence with surface hardness for metals implanted with N+

Zhang, Jianhua

**Source:** *Cailiao Kexue yu Gongyi/Material Science and Technology*, v 5, n 3, p 66-70, 1997; **Language:** Chinese;

**ISSN:** 10050299

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 22. Soliton-like solution for nonlinear wave motion in elastic media

Zhang, Ruiping ; Sun, Jiaju

**Source:** *Ying Yong Li Xue Xue Bao/Chinese Journal of Applied Mechanics*, v 14, n 1, p 99-102, Mar 30 1997;

**Language:** Chinese; **ISSN:** 10004939

**Database:** Compendex

**Data Provider:** Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

## 23. Theory of petroleum system (PS) and the classification of the PS in northwest China

Zhao, Jingzhou

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 14-18, 38, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** Petroleum system is composed of 5 essential elements and 5 essential processes. The five elements are hydrocarbon source rock, reservoir, cap rock, trap and migration pathway, and the five processes are hydrocarbon generation, migration, accumulation, trap formation and post-diagenesis. The petroleum system can be divided into 3 different hierarchic categories, that is, supersystem, system and subsystem. The supersystem is suitable for the classification of the PS of the mixed basins and the regions between basins, and for the description of the global PS. The system and subsystem are suitable for the classification of the PS within a basin. A system must contain a hydrocarbon source rock at least, but a subsystem needn't. In addition, the petroleum system in northwest China is also discussed in this paper, which can be classified into 3 types: foreland type, craton-foreland mixed type and orogenic belt type. Their respective diagenesis conditions and characteristics, and hydrocarbon potentials are analysed.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 24. Study of unbalance development for closed gas reservoir

Gao, Chengtai ; Zhang, Minyu ; Yang, Ling

**Source:** *Shiyou Xuebao/Acta Petrolei Sinica*, v 18, n 1, p 70-76, Jan 1997; **Language:** Chinese; **ISSN:** 02532697

**Database:** Compendex

**Data Provider:** Engineering Village

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## 25. Study on the free radicals in the oxidation of some compounds with o-hydroxyphenyl group

Wang, Yukun

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 49-51, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** This paper studies the free radicals yielded in the reactions between superoxide anion radical and catechol (or DOPA, quercetin, etc.) in aqueous solutions by ESR technique. It can be inferred from the hfs constants of ESR spectra observed that these free radicals are all o-semiquinoid anion radicals. In spin trapping experiments, it was also found that the superoxide anion radicals were get from the reactions of O<sub>2</sub> with some compounds with o-hydroxyphenyl group in acetonitrile, which evidently shows that new active oxygen species might be produced during the antioxygenic process of some important biological antioxidants.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 26. Visualization study of pore-level displacement of oil by water in a conglomerate reservoir

Gao, Yongli ; He, Qiuxuan

**Source:** *Xinan Shiyou Xueyuan Xuebao/Journal of Southwestern Petroleum Institute*, v 19, n 3, p 60-63, 1997;

**Language:** Chinese; **ISSN:** 10002634

**Database:** Compendex

**Data Provider:** Engineering Village

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## 27. Sidewall surrounding rock thermal stress analyses

Yu, Zhiqing ; Xu, Huayi

**Source:** *Shiyou Zuantan Jishu/Petroleum Drilling Techniques*, v 25, n 4, p 13-15, 1997; **Language:** Chinese; **ISSN:** 10010890

**Database:** Compendex

**Data Provider:** Engineering Village

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## 28. Influence of drill fluid feedback on lateral vibration of drill stem

Zhang, Guangwei

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 3, p 8-10, 35, Mar 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

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## 29. Consistency check for multisensor data fusion

Wang, Jiangping ; Shen, Lixiang ; Shen, Yudi

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 11, p 25-28, 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

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## 30. On the accumulation formation of the GM in grey prediction

Zhang, Zixu

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 52-54, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** Accumulation formation of the original data is a important concept in grey theory. This paper analyses the process of accumulation formation. It is shown that the weight coefficients of the formed serial numbers obey the law of Pascal's triangle, that is, the more the number of times of accumulation, the greater the weight of old information. This is the essence that accumulation formation weakens the randomness of the original number series. It is pointed out that there is a inevitable error when differential equation of the first order is taken as prediction model.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 31. Reasonable machining variables for finishing precision workparts

Dong, Pengmin ; Wang, Yimin ; Tan, Quanqin

**Source:** *Jingangshi yu Moliao Moju Gongcheng/Diamond & Abrasives Engineering*, n 1, p 20-22, 1997; **Language:** Chinese; **ISSN:** 1006852X

**Database:** Compendex

**Data Provider:** Engineering Village

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### 32. Properties of ordinary differential equations' solutions of interval-valued function and fuzzy-valued function

Xiao, Xiaonan

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 55-56, 1997; **Language:** Chinese; **ISSN:** 10015361

**Abstract:** The continuity and the differentiability of ordinary differential equation's solution of interval-valued function to initial value are derived from those of ordinary function. On the basis of this, those of fuzzy-valued function are discussed by decomposition theorem in fuzzy sets.

**Database:** Compendex

**Data Provider:** Engineering Village

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### 33. Process of realizing oil transportation by controlling flow

Li, Ming ; Xu, Chang'an

**Source:** *You Qi Chu Yun/Oil & Gas Storage and Transportation*, v 16, n 8, p 10-12, Aug 1997; **Language:** Chinese; **ISSN:** 10008241

**Database:** Compendex

**Data Provider:** Engineering Village

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### 34. Determination of trace vanadium in crude oil and diesel oil by optical waveguides spectrophotometry

Liu, Shuren ; Du, Guilin ; Nie, Maiqian ; Xu, Jian ; Nie, Baoli

**Source:** *Shiyou Xuebao, Shiyou Jiagong/Acta Petrolei Sinica (Petroleum Processing Section)*, v 13, n 3, p 88-92, Sept 1997; **Language:** Chinese; **ISSN:** 10018719

**Database:** Compendex

**Data Provider:** Engineering Village

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### 35. Variation of rheologic parameters of waxy crude oil after treatment

Li, Ming ; Yang, Zhengyi ; Zhao, Dazhuang

**Source:** *Zhuzao/Foundry*, n 3, p 1-3, Mar 22 1997; **Language:** Chinese; **ISSN:** 10014977

**Database:** Compendex

**Data Provider:** Engineering Village

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### 36. Fast Fourier transform (FFT) program designed with 8096 assembly language

Fu, Xiaoning

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 4, p 48-49, 43, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Abstract:** It has been applied in intelligence control of instruments to make real-time FFT of the gathered data by using chip computers. The authors give the idea and experience of programming FFT with 8096 assembly language. The realization of FFT is based on 8096'S 4 - byte floating point arithmetic function. In programming, the inverted input/decimation-in-time FFT algorithm and the 2-based arithmetic generally used are be chosen. The FFT program consists of three parts: the inversion processing, the main program and the butterfly shaped computation subroutine. The inversion processing produces the inverted sequence; the main program provides the entrance and parameters for the butterfly shaped computation; The butterfly shaped computation subroutine, which is the core of the FFT program and given in this paper, decides the real-time performance of the main program to a great extent. The FFT program has a good real-time response, its butterfly shaped computation is simple, and it has been applied in a oil instrument. The idea is suitable for programming FFT with not too many dots and for programming FFT with other assembly language. (3 refs)

**Main heading:** Computer software

**Controlled terms:** Fast Fourier transforms - Computer programming languages - Intelligent control - Algorithms - Digital arithmetic - Inverse problems - Microprocessor chips - Real time systems - Computational methods

**Uncontrolled terms:** Assembly language - Butterfly shaped computation - Chip computers - Floating point arithmetic function - Inversion processing

**Classification Code:** 723.1 Computer Programming - 921.3 - 723.1.1 - 723.4.1 - 723.5 - 721.1

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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### 37. Approach to formation damage control in horizontal wells

Zhang, Ningsheng ; Liu, Wenhong

**Source:** *Shiyou Kan Tan Yu Kai Fa/Petroleum Exploration and Development*, v 24, n 4, p 68-71, Aug 1997;

**Language:** Chinese; **ISSN:** 10000747

**Database:** Compendex

**Data Provider:** Engineering Village

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### 38. Prediction of fatigue life for peened butt welds of 16Mn steel

Li, Zhen ; Zheng, Xiulin

**Source:** *Hanjie Xuebao/Transactions of the China Welding Institution*, v 18, n 3, p 151-158, Sept 1997; **Language:**

Chinese; **ISSN:** 0253360X

**Database:** Compendex

**Data Provider:** Engineering Village

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### 39. Working parameters of electric motor on beam pumping units

Wu, Yijiong

**Source:** *Shiyou Jixie/China Petroleum Machinery*, v 25, n 7, p 33-36, July 1997; **Language:** Chinese; **ISSN:** 10014578

**Database:** Compendex

**Data Provider:** Engineering Village

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### 40. Predicting oil and water production of oil wells by artificial nerve network

Li, Lun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 20-23, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper expounds a new method of predicting the oil and water production of oil wells by artificial nerve network. The method uses the actual daily average oil production and daily average water production per month in the past as the training sample. After learning by the network, the daily average production and daily average water production can be predicted by inputting the time to be predicted. The general purpose software programmed by the author was verified by actual oil production and water production of 21 wells in Shengli Oil Field. The results show that nerve network is a feasible method of predicting producing rate of single well in the oil field. (5 refs)

**Main heading:** Oil well production

**Controlled terms:** Computer software - Neural networks - Oil fields

**Uncontrolled terms:** Production forecasting - Well production rate

**Classification Code:** 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 723 Computer Software, Data Handling and Applications - 723.4 Artificial Intelligence

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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### 41. Finite element analysis of stress concentration factor of butt welded joint

Li, Dong-cai (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 30-34, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The stress concentration factor (SCF) of butt welded joint was calculated by finite element method. The influence of weld toe angle and weld toe transition radius on SCF was also analyzed. The result shows that it is possible to ease the stress concentration of butt welded joint effectively by decreasing the weld toe angle or/and increasing the weld toe transition radius, and that the introduction of weld toe transition is favourable to the prevention of cracks from the respects of mechanics and welding metallurgy. It's also pointed out that the weld joints with strengthened height on one side has smaller stress concentration factor than those having strengthened height on both sides. (6 refs)

**Main heading:** Welds

**Controlled terms:** Butt welding - Cracks - Finite element method - Fracture mechanics - Stress analysis - Stress concentration - Stress intensity factors

**Uncontrolled terms:** Weld toe angle - Weld toe transition radius

**Classification Code:** 421 Strength of Building Materials; Mechanical Properties - 422 Strength of Building Materials; Test Equipment and Methods - 538.2 Welding - 921.6 Numerical Methods - 931.1 Mechanics

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 42. Investigation on bend strength and bend limitation corner of casings

Wang, Jian-jun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 24-26, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The bend strength of casings at curved well segment was investigated based on the theory of plasto-elasticity and limitation analysis in this paper. The formulas of the bend strength and bend limitation corner of casings were obtained. It is show that the first bend limitation corner  $\beta_1$  can be considered as the basis on which the casing material is chosen, whereby the bend limitation criterion of casing design is put forward as  $Y_{max1}$ . By combining with the cementing technology of Saiping-1 horizontal well in Changqing Oil Field, limitation corners of various casings were calculated. And by using the criterion of limitation corner, the material of technical casings and casings used in oil layers were chosen, which provides theoretical basis for the structure design of casing string. Moreover the bend strength of the casing chosen was checked. (3 refs)

**Main heading:** Oil well casings

**Controlled terms:** Bending strength - Elastoplasticity - Horizontal wells

**Uncontrolled terms:** Bend limitation corner - Limitation analysis

**Classification Code:** 421 Strength of Building Materials; Mechanical Properties - 511.2 Oil Field Equipment - 512.1.1 Oil Fields

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 43. On the influence of the formulation of Ni-P coating on the characteristics of impingement corrosion resistance

Wang, Jin-gang (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 34-36, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper studied the behavior of impingement corrosion resistance of Ni-P coatings of different formulations in mediums with and without HCl. Comparison was made between the behavior of chemical coating with that of stainless steel (1Cr18Ni9Ti and 2Cr13). The experiment was made with self-made experiment device. The results show that the impingement corrosion mechanism of Ni-P coating are mainly exfoliation and micro-cutting. But in the oar containing HCl, the performance of impingement corrosion resistance is superior to that in oar without HCl. In corrosive medium with Cl<sup>-</sup> and H<sup>+</sup>, the property of impingement corrosion resistance of Ni-P chemical coating is superior to that of 1Gr18Ni9Ti; and 2CrB. (4 refs)

**Main heading:** Nickel compounds

**Controlled terms:** Corrosion resistance - Hydrochloric acid - Inorganic coatings - Plating - Stainless steel

**Uncontrolled terms:** Chemical plating - Exfoliation - Impingement corrosion resistance - Microcutting - Nickel phosphorus coatings

**Classification Code:** 539.2 Corrosion Protection - 539.3 Metal Plating - 545.3 Steel - 804.2 Inorganic Compounds - 813.2 Coating Materials

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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#### 44. Application of biacetyl reaction in the content determining of dicyandiamide

Shi, Jun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 46-48, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** A colorimetric method for the content determining of industrial dicyandiamide is introduced in this paper. Its determining basis is on biacetyl reaction (that is, the reaction of guanidino-compound with biacetyl in alkaline solution in the presence of  $\alpha$ -naphthol). A red compound is produced in the reaction. It has a great absorptivity to the light wave whose wavelength is 530 - 560nm (molar absorptivity  $\epsilon=1.66 \times 10^4 \text{Lmol}^{-1}\text{cm}^{-1}$ ), so it can be determined with colorimetric method. The linear concentration range in accord with Beer's Law is 0 - 14 mgL<sup>-1</sup>. The rate of recovery of 98% approx. 101% can be obtained with this method, and the relative standard deviation is  $\pm 0.59\%$ . Besides, this method can also be used for analysing and monitoring of dicyandiamide residues. (12 refs)

**Main heading:** Colorimetry

**Controlled terms:** Chemical analysis - Chemical reactions - Composition - Light absorption - Optical properties - Organic compounds

**Uncontrolled terms:** Biacetyl reaction - Dicyandiamide

**Classification Code:** 741.1 Light/Optics - 801.1 Chemistry, General - 802.2 Chemical Reactions - 804.1 Organic Compounds - 941.4 Optical Variables Measurements

**Treatment:** Applications (APP) - Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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#### 45. Application of fuzzy cluster analysis in determining the plan of processing crude oil

Hou, Hai-qing (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 3, p 26-27, 34, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** By applying the method of fuzzy cluster analysis and taking similarity as the only standard, the paper processed the data which reflect the permeability, viscosity, acidity, freezing point, carbon residue and sulfur content of crude oil to be refined together with the property parameters of crude oil which was already refined. The crude oil was classified according to different section value. The processing plan and operating parameters of crude oil to be processed were decided by referring to the processing plan of the crude oil belonging to the same kind. The results indicate that when the section is equal to 0.95, the crude oil to be refined has a good similarity with MINAS oil. The method has overcome the phenomenon of evaluation being later than processing and the evaluation conforms with the conventional one. It is of high time effectiveness and realistic significance. (5 refs)

**Main heading:** Crude petroleum

**Controlled terms:** Evaluation - Petroleum analysis - Petroleum refining - pH - Statistical methods - Viscosity

**Uncontrolled terms:** Carbon residue - Freezing point - Fuzzy cluster analysis - Processing plan

**Classification Code:** 512.1 Petroleum Deposits - 513.1 Petroleum Refining, General - 801.1 Chemistry, General - 922.2 Mathematical Statistics - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Applications (APP)

**Database:** Compendex

**Data Provider:** Engineering Village

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#### 46. Synthesis of light stabilizers of several kinds of polymers

Wang, Yu-kun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 47-49, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** According to the aging mechanism of polymers by light, the paper puts forward the composition features of suitable age-resisting additions which get rid of light and are suitable with oxygen existing. The synthesizing conditions are discussed. Three kinds of additions were synthesized which can resist light and oxygen aging and bear esters of piperidinol. (6 refs)

**Main heading:** Organic polymers

**Controlled terms:** Aging of materials - Composition - Esters - Light - Oxygen - Synthesis (chemical)

**Uncontrolled terms:** Light stabilizers - Piperidinol

**Classification Code:** 741.1 Light/Optics - 801.4 Physical Chemistry - 802.2 Chemical Reactions - 804.1 Organic Compounds - 815.1.1 Organic Polymers - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 47. Synthesis of t-BBNO free radical and study of its molecular structure by ESR spectra

Wang, Yukun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 4, p 34-36, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** N-(3,5-dinitro)-benzoyl-N-tert-butyl nitroxide (t-BBNO) has been synthesized. According to the data obtained from the spectra of electronic spin resonance (ESR), its molecular structure and the solvent effect are studied. It is found that, being different from the other nitroxides, the ESR's aN value of t-BBNO free radical hardly changes with the polarity of solvents, which shows that the solvent effect has close something to do with the molecular structure of solute. (6 refs)

**Main heading:** Hydrocarbons

**Controlled terms:** Composition effects - Electron spin resonance spectroscopy - Free radical reactions - Molecular structure - Organic solvents - Synthesis (chemical)

**Uncontrolled terms:** Dinitro benzoyl tertbutyl nitroxide - Polarity of solvents - Solvent effect

**Classification Code:** 801.1 Chemistry, General - 801.4 Physical Chemistry - 802.2 Chemical Reactions - 803 Chemical Agents and Basic Industrial Chemicals - 804.1 Organic Compounds - 931.3 Atomic and Molecular Physics

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 48. Dual frequency diversity four phase DPSK combination coding modulation combining with frequency hopping

Qin, Yi (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 4, p 37-39, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** In this paper is put forward a new modulation scheme called dual frequency diversity four phase DPSK combination coding modulation combining with frequency hopping. It can be applied to data transmission on the software multipath channel. In accordance with the features of the shortwave channel, this code is formed by using of combination coding, frequency diversity and frequency hopping techniques. The principle is explained in which the combination coding modulation system reduces the intersymbol interference due to multipath and the effect which fading has on the signals with the help of frequency diversity. Finally, the ranges of the main parameters of the system are determined, and the performance of the shortwave data transmission systems adopting the system is analysed.

**Main heading:** Phase modulation

**Controlled terms:** Diversity reception - Fading (radio) - Frequency hopping - Performance - Phase shift keying - Radio interference - Radio transmission - Signal encoding

**Uncontrolled terms:** Coding modulation - Combination coding - Dual frequency diversity - Shortwave multipath channel

**Classification Code:** 716.1 Information Theory and Signal Processing - 716.3 Radio Systems and Equipment

**Treatment:** Applications (APP) - General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 49. Mechanism study of formation damage in the reservoir with fractures and its releasing methods

Zhang, N. (1); Zhao, Y. (1)

**Source:** *Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97*, p 5.101-5.105, 1997; **Conference:** Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97, October 7, 1997 - October 10, 1997; **Publisher:** Int Acad Publ

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** This paper is directed against characteristic of fractured formation, the mechanisms of deposition of the reservoir with fractures is analyzed, and the models for calculating permeability, and the relationship between the porosity of reservoir with fractures and particle concentration in moving, and describing the change of particles concentrations in fracture were developed. On the base of mass balance of particles, with discussion of deposition and diffusivity of particles while moving in medium, the differential equation for fracture porosity as a function of time and place was developed. The effect of particle concentration and injection rate on the fractural formation damage was discussed. Base on above theoretical analysis of the damage of fracture formation, the counter measure of fracture formation protection was presented. (4 refs)

**Main heading:** Fracturing (oil wells)

**Controlled terms:** Fracturing fluids - Mathematical models - Mechanical permeability - Oil bearing formations - Particles (particulate matter) - Petroleum reservoirs - Porosity

**Uncontrolled terms:** Formation damage - Fractured formations

**Classification Code:** 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 804 Chemical Products Generally - 921 Mathematics - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 50. Analysis of reservoir geological factors in horizontal well optimizing design

Wang, Juemin (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 19-22, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Not only drilling technology and mechanical factors, but also reservoir geological factors should be taken into consideration in horizontal well hole trajectory optimizing design. According to the practice of Saiping-1 horizontal well design and the domestic and overseas information concerning horizontal well. This paper discusses the effect of geological factors, such as geological type, pay thickness, the geometric shape of pay-zone, reservoir non-uniformity, etc. on the horizontal well hole trajectory optimizing design, and analyses the principle and the method of determining the parameters such as the azimuth, length and vertical depth of horizontal section, the positions of targeted point and primary kickoff point, hole size, etc. in order to reach unanimity of geological conditions with drilling engineering. (4 refs)

**Main heading:** Petroleum geology

**Controlled terms:** Design - Horizontal wells - Oil well drilling - Optimization - Petroleum reservoir engineering - Petroleum reservoirs

**Uncontrolled terms:** Hole trajectory - Reservoir geological factors

**Classification Code:** 481.1 Geology - 512.1 Petroleum Deposits - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 921.5 Optimization Techniques

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 51. Synthesis of sodium methylene phosphonates and investigation of their scale inhibiting properties

Yin, Xiao-hong (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 50-51, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** A method which was advanced by Moederitzer K. and is similar to Mannich reaction was used to synthesize scale inhibitors, such as sodium ethylenediamine-tetramethylene phosphonate, sodium diethylene-triamine-pentamethylene phosphonate, sodium tria-ethylene-tetramine-hexamethylene phosphonate, sodium polyethylene-polyamine-polymethylene phosphonate, sodium imidazole-dimethylene phosphonate by reaction of ethylenediamine, diethylene-triamine, triethylene-tetramine, polyethylene-polyamine and imidazole respectively with formalin and phosphorus trichloride. Their scale inhibiting properties were investigated by statics scale inhibiting method. The effect on scale inhibiting ratio by the factors such as, the concentration of the scale inhibitor, the concentration of calcium ions and PH value were investigated too. The experiment results show that sodium methylene phosphonates, esp. sodium ethylenediamine-tetramethylene phosphonate possess very good scale inhibiting property. The concentration of both scale inhibitor and calcium ions affects the scale inhibiting ratio. The polymer inhibitor of this kind is not suitable for the condition of high alkali. (4 refs)

**Main heading:** Sodium compounds

**Controlled terms:** Agents - Calcium - Composition effects - Ions - pH - Scale (deposits) - Synthesis (chemical)

**Uncontrolled terms:** Scale inhibiting ratio - Scale inhibitors - Sodium methylene phosphonates

**Classification Code:** 549.2 Alkaline Earth Metals - 801.1 Chemistry, General - 801.4 Physical Chemistry - 802.2 Chemical Reactions - 803 Chemical Agents and Basic Industrial Chemicals - 804.1 Organic Compounds

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 52. On the essential differences between Kriging estimation and stochastic simulation

Zhang, Tuan-feng (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 52-55, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Kriging estimation and stochastic simulation which are the two parts of geostatistics are introduced in this paper. Kriging estimation is the best linear unbiased estimation under the conditions of average square loss function. It has a smoothing effect and is adaptable for depicting geologic phenomenon with gradual variation. Being a new region of geostatistics, stochastic simulation is an important part of reservoir characterization. It has more advantages of quantifying reservoir with severe heterogeneities and various kinds of probable stochastic images of reservoir. These realizations show the heterogeneities and uncertainties of spatial distribution of reservoir characteristics. The essential differences between Kriging estimation and stochastic simulation are discussed. (6 refs)

**Main heading:** Geology

**Controlled terms:** Computer simulation - Data processing - Estimation - Petroleum reservoirs - Random processes

**Uncontrolled terms:** Geologic data processing - Heterogeneity - Kriging estimation

**Classification Code:** 481.1 Geology - 512.1.1 Oil Fields - 723.2 Data Processing and Image Processing - 723.5 Computer Applications - 922.2 Mathematical Statistics

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 53. Fast Fourier transform (FFT) program designed with 8096 assembly language

Fu, Xiaoning (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 4, p 48-49, 43, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** It has been applied in intelligence control of instruments to make real-time FFT of the gathered data by using chip computers. The authors give the idea and experience of programming FFT with 8096 assembly language. The realization of FFT is based on 8096'S 4 - byte floating point arithmetic function. In programming, the inverted input/decimation-in-time FFT algorithm and the 2-based arithmetic generally used are be chosen. The FFT program consists of three parts: the inversion processing, the main program and the butterfly shaped computation subroutine. The inversion processing produces the inverted sequence; the main program provides the entrance and parameters for the butterfly shaped computation; The butterfly shaped computation subroutine, which is the core of the FFT program and given in this paper, decides the real-time performance of the main program to a great extent. The FFT program has a good real-time response, its butterfly shaped computation is simple, and it has been applied in a oil instrument. The

idea is suitable for programming FFT with not too many dots and for programming FFT with other assembly language. (3 refs)

**Main heading:** Computer software

**Controlled terms:** Algorithms - Computational methods - Computer programming languages - Digital arithmetic - Fast Fourier transforms - Intelligent control - Inverse problems - Microprocessor chips - Real time systems

**Uncontrolled terms:** Assembly language - Butterfly shaped computation - Chip computers - Floating point arithmetic function - Inversion processing

**Classification Code:** 721.1 Computer Theory, Includes Formal Logic, Automata Theory, Switching Theory, Programming Theory - 723.1 Computer Programming - 723.1.1 Computer Programming Languages - 723.4.1 Expert Systems - 723.5 Computer Applications - 921.3 Mathematical Transformations

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 54. Application of neural networks and expert system in the interpretation of well test

Cheng, Sui-min (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, 3pp, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper expounds in detail a new method of identifying the well test interpretation model by using the expert system and artificial neural networks. First, artificial intelligence was used to identify the pressure derivative plots of well test model, and a modular recognition system constructed with expert system was set up. Then the artificial neural networks was used to identify the well test interpretation model. This system can identify the well test interpretation model according to the new well test data. Finally the neural networks and expert system were used together for well test interpretation. Practical identification results show that the method is very effective. It can identify incomplete well test data even with noise. The identification accuracy is very high compared with other methods. (6 refs)

**Main heading:** Well testing

**Controlled terms:** Data reduction - Expert systems - Mathematical models - Neural networks - Pattern recognition systems - Well pressure

**Uncontrolled terms:** Modular recognition system - Pressure derivative plots - Well test interpretation

**Classification Code:** 512 Petroleum and Related Deposits - 723.2 Data Processing and Image Processing - 723.4 Artificial Intelligence - 723.4.1 Expert Systems - 921.6 Numerical Methods

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 55. Application of short wave technique in the transmission of data information in oilfields

Meng, Kaiyuan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 26-29, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** In the process of oilfield exploration, development and construction, various field data information must be transmitted to decision departments. For this reason, this paper puts forward a short wave data information transmission technique, which is suitable for the communication in bad conditions and at a long distance. Its quality of transmission data information is high and cost is low. The technique provides a reliable communication means for the modernization and automation of the oilfield production management and construction. Short wave channel is the most complicated of common channels. It realizes communication by ionization reflecting electromagnetic wave. Controller is a key device in short wave communication. This paper discusses the basic problems in short wave communication, the principle of the controller, and the software for controlling of receiving and sending data. The important parameters describing the system's properties are also given. Because the mixed error control technique is adopted in the system, its bit error rate is less than  $10^{-8}$  in receiving data. (4 refs)

**Main heading:** Oil fields

**Controlled terms:** Automation - Bit error rate - Computer control systems - Computer software - Data communication systems - Electromagnetic waves - Modernization - Oil field development - Oil well production - Petroleum prospecting - Radio communication

**Uncontrolled terms:** Ionization reflecting electromagnetic wave - Mixed error control technique - Short period wave  
**Classification Code:** 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 711.1 Electromagnetic Waves in Different Media - 716.3 Radio Systems and Equipment - 731.2 Control System Applications  
**Treatment:** Applications (APP) - General review (GEN)  
**Database:** Compendex  
**Data Provider:** Engineering Village  
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## 56. Method of signal time-frequency representation

Qiang, Lin (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 4, p 50-53, 56, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** A method of signal time-frequency representation with phase factor is introduced. It is based on a movable and changeable scale Gaussian window, whose size has something to do with the frequencies of signal, and has correspondingly something to do with Fourier frequency spectrum of signal. This paper discusses the method in mathematics, and shows its advantages in signal time - frequency analysis by examples. (3 refs)

**Main heading:** Signal theory

**Controlled terms:** Fast Fourier transforms - Frequency domain analysis - Signal processing - Spectrum analysis - Time domain analysis - Wavelet transforms

**Uncontrolled terms:** Frequency analysis - Gaussian window - Phase factor - Signal time frequency representation

**Classification Code:** 716.1 Information Theory and Signal Processing - 921.3 Mathematical Transformations - 921.6 Numerical Methods

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 57. Design of a planar buried auto-focus optical waveguide

Jia, Zhenan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 3, p 32-34, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The design of a planar buried auto-focus optical waveguide is the basis for studying it, and its performance and quality have directly something to do with its design. This paper analyses the requirements for the material of the waveguide's basement, discusses some problems relating to the shape design of the waveguide in detail, and gives the formulas that describe the relations among the parameters of a waveguide linked by a circular arc. It also gives the main parameters of a waveguide sample and the results of its performance test. (4 refs)

**Main heading:** Optical waveguides

**Controlled terms:** Fiber optics - Optical materials - Performance - Testing

**Uncontrolled terms:** Circular arc - Planar buried auto focus optical waveguide

**Classification Code:** 714.3 Waveguides - 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems

**Treatment:** Applications (APP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 58. Whirling analysis of the rotary drill string by the action of drilling fluid inside and outside the drill string

Qu, Zhan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 27-29, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper studied theoretically the whirling of rotary drill string by the action of drilling fluid inside and outside the drill string. It analyzed the affection on the drill string motion by the sum of perturbing pressure produced by both hydrodynamic pressure of drilling fluid inside the drill string with the rotating of the drill string and the bending

deformation of the drill string, derived the dynamic conditions of keeping the drill string whirling in a regular manner. It also analyzed the phenomenon of reactive self-exciting on the rotary drill string, which is attributed to the drilling fluid outside the drill string. The critical condition of unstable whirling of the drill string was obtained by building and solving the mathematical model. The paper discussed in detail the mechanical mechanism and operating laws of the drill string's whirling course by the action of drilling fluid inside and outside the drill string. (6 refs)

**Main heading:** Oil well drilling equipment

**Controlled terms:** Drilling fluids - Hydrodynamics - Mathematical models - Pressure effects - Rotation - Vibrations (mechanical)

**Uncontrolled terms:** Hydrodynamic pressure - Rotary drill strings

**Classification Code:** 511.2 Oil Field Equipment - 631.2 Hydrodynamics - 803 Chemical Agents and Basic Industrial Chemicals - 921 Mathematics - 931.1 Mechanics

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 59. Characteristics of hydrocarbon primary migration in Eerduosi Basin

Liu, Yong (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 8-11, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Based mainly on the mudstone compaction, burial history and the characteristics of hydrocarbon generation, the paper analyzed the motive force, depth, time and direction of the primary migration in No. 7 Strata of Yanchang FM in Eerduos Basin. The results show that the primary migration occurred because of the excessive pressure produced by the insufficient compaction of mudstone developed in the broad zone of No. 7 Strata; The depth of the migration is decided by the maturity depth and the starting depth of abnormal compaction; The primary migration occurred mainly in the periods of K12 and K13 deposition and the direction of migration is mainly upward. The large scale of connected zones between sourcerock and the reservoir and the zone where facies transition took place are more favourable places for hydrocarbon expelling. (3 refs)

**Main heading:** Petroleum geology

**Controlled terms:** Geochronology - Hydrocarbons - Petroleum reservoirs - Pressure effects - Tectonics

**Uncontrolled terms:** Hydrocarbon primary migration

**Classification Code:** 481.1 Geology - 481.3 Geophysics - 512.1 Petroleum Deposits - 512.1.1 Oil Fields - 804.1 Organic Compounds

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 60. Experimental study of characteristics of gas flow in tight formation

Ren, Xiaojuan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 3, p 22-25, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** This paper studies the characteristics of gas flow in low permeability cores which were get from the middle district of shaan-Gan-Ning and in which there exists residual water. A lot of experimental results show that: (1) There exist many forms of gas flow in low permeability cores. This has something to do with the permeability, water saturation and pressure gradient of the cores. (2) When water saturation is lower (30%, but less than irreducible water saturation), there exists non-Darcy flow. The non-Darcy flow is non-linear flow under lower pressure gradient. However, the non-Darcy flow is linear flow under higher pressure gradient, i.e., the apparent gas permeability increases as the pressure gradient increases. After the pressure gradient comes up to certain value, the apparent gas permeability does not change with the pressure gradient. Compared with linear Darcy flow, the gas flow exist extra pressure lost. This paper also has preliminarily analyzed the reasons why gas flow in low permeability cores has many forms and the ranges in which the forms exist. (6 refs)

**Main heading:** Flow of fluids

**Controlled terms:** Core analysis - Mechanical permeability - Pressure - Water

**Uncontrolled terms:** Darcy flow - Low permeability cores - Non Darcy flow - Pressure gradient - Residual water - Tight formation - Water saturation

**Classification Code:** 512.1.2 Petroleum Deposits : Development Operations - 631.1 Fluid Flow, General - 804.2

Inorganic Compounds - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 61. Test unit for protector's performances of electric submersible centrifugal pump

Fan, Zheng-xiang (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 37-38, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper introduced the structure, test principles and characteristics of the protector of an electric submersible centrifugal pump. The unit can detect the power consumption and sealing property of the protector and determine whether they meet the requirements. The test principles are simple and reliable and the results are accurate for there is not any unnecessary middle links. (3 refs)

**Main heading:** Submersible pumps

**Controlled terms:** Centrifugal pumps - Energy utilization - Equipment testing - Performance - Sealing (closing)

**Uncontrolled terms:** Electric submersible centrifugal pump - Power consumption

**Classification Code:** 618.2 Pumps

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 62. Application of programmable controller to the plasma spraying equipment

Lu, Yan-ling (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 39-42, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The technological process of plasma spraying is complicated and there are many switches to be controlled. The present existing plasma spraying system is not reliable and liable to troubles. The paper introduces a programmable controller of Model C60P to control the technological process of plasma spraying. It also introduces the control system of the detection circuit, the protection system. The authors designed the logic diagram of the technological process, the hardware of resisting high frequency interference, the interface distributing system and the programming software. It is proved that the improved equipment has overcome the defects of the original. (2 refs)

**Main heading:** Programmable logic controllers

**Controlled terms:** Computer software - Interfaces (computer) - Plasma spraying - Process control - Protection - Welds

**Uncontrolled terms:** High frequency interference - Plasma spraying systems

**Classification Code:** 722.2 Computer Peripheral Equipment - 723.1 Computer Programming - 731.1 Control Systems - 732.1 Control Equipment - 813.1 Coating Techniques - 932.3 Plasma Physics

**Treatment:** Applications (APP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 63. Research of enhancing the precision of drilling engineering budget

Chen, Jun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 17-19, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** At present, the budget (period and cost) of drilling engineering is based on the standard well, and is readjusted segment by segment according to the difference of depth between the designed and the standard wells. That budget method is unreasonable and has great error in actual application. This paper, proceeding from statistics, puts forward the new concept of well depth adjustment factor for drilling engineering budget and established the basic budget models. Practical application examples show that this method can greatly raise the precision of drilling engineering budget. Being scientific and reasonable, it is expected to achieve good results in actual applications.

**Main heading:** Oil well drilling

**Controlled terms:** Budget control - Cost accounting

**Uncontrolled terms:** Drilling engineering budget

**Classification Code:** 511.1 Oil Field Production Operations - 911.1 Cost Accounting - 911.2 Industrial Economics

**Treatment:** Economic (ECO)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 64. Analysis of pressure pulsation before the servovalve of electro-hydraulic servo simulation system of well pumping unit

Gao, Ji-nian (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 35-37, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The main reason of pressure pulsation before the servovalve of electro-hydraulic servo simulation system of well pumping unit is the output pressure pulsation of the oil pump and flow change of the servo valve. The simulation precision of hanging point movement will be influenced by the pressure pulsation before the servovalve, and the more the stroke occurs, the more serious the influence will be. The way of restraining and weakening the pulsation is to select rational hydraulic parts for the valve filter. Numerical simulations of pressure pulsation before the servovalve were made for the two working processes with and without accumulator filter. The results of the simulations conform basically with the theoretical analysis.

**Main heading:** Oil well pumps

**Controlled terms:** Computer simulation - Filters (for fluids) - Flow control - Hydraulic servomechanisms - Pressure control - Pressure effects

**Uncontrolled terms:** Pressure pulsations - Servovalves

**Classification Code:** 511.2 Oil Field Equipment - 631.1 Fluid Flow, General - 632.2 Hydraulic Equipment and Machinery - 723.5 Computer Applications - 731.3 Specific Variables Control - 732.1 Control Equipment

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 65. Study of a new forward-feeding artificial neural network - neural network of local domain connection

Wang, Zhengyin (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 3, p 49-52, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The standard forward-feeding BP network with two hidden layers can solve any classification problems if it includes enough processing elements. But when used for the classification of several patterns, it has some shortcomings as follows: (1) an identical network structure is used for different patterns; (2) when a new pattern is added to the training set, the network must be trained again; (3) it is difficult to study the mechanism of the network recognition. In the paper, the author puts forward an improved structure of forward-feeding network - local domain connection neural network (LDCNN). Its hidden layer neurons are divided into several groups, and each neuron output only connects to one of the groups. Learning algorithm for LDCNN is similar to BP. LDCNN has some advantages as follows: (1) according to the training set, LDCNN can construct the network structure by itself; (2) identical features can be easily obtained from each pattern after LDCNN is properly trained; (3) LDCNN can implement supplementary learning when a new pattern is added to the training set. Five classes of sediments were recognized by using LDCNN and standard BP network respectively, and it is shown that the learning and testing performance of LDCNN is better than that of standard BP network. (7 refs)

**Main heading:** Feedforward neural networks

**Controlled terms:** Data processing - Learning algorithms - Pattern recognition - Performance

**Uncontrolled terms:** Local domain connection - Nerve network - Network structure - Training set

**Classification Code:** 723.2 Data Processing and Image Processing - 723.4 Artificial Intelligence - 723.5 Computer Applications

**Treatment:** Applications (APP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 66. Effect of residual water saturation on the characteristics of gas flowing in tight carbonate media

Ren, X.-j. (1); He, Q.-X. (1); Yan, Q.-l. (1); Zhang, M.-y. (1)

**Source:** *Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97*, p 6.44-6.46, 1997; **Conference:** Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97, October 7, 1997 - October 10, 1997; **Publisher:** Int Acad Publ

**Author affiliation:** (1) Xi'an Petroleum Inst, Shaanxi, China

**Abstract:** Gas flowing is often considered as Darcy flow in gas reservoirs. However, because the separation of gas and water is poor in the tight gas formations, there exists higher residual water saturation. Though the residual water can not move, it affects the ability of gas flowing. This paper discusses the characteristics of gas flowing when there exists immobile water in tight carbonate media. In this experiment, a lot of natural cores (34) were used. The pressure gradient in the experiment is matched with actual gas reservoirs. Using stilled water and nitrogen gas replaces in-situ water and natural gas in the experiment. The experiment results indicate: (1) When the immobile water saturation is larger than 30-34%, gas flowing behavior will perform the characteristics of non-Darcy flow, and gas apparent permeability is the function of absolute permeability and pressure gradient; there exists starting pressure gradient at some conditions. (2) The characteristics of gas non-Darcy flow is affected by the absolute permeability, immobile water saturation and the porous structures. (7 refs)

**Main heading:** Two phase flow

**Controlled terms:** Carbonate minerals - Mechanical permeability - Natural gas fields - Porosity - Pressure drop - Water

**Uncontrolled terms:** Gas flow - Water saturation

**Classification Code:** 482.2 Minerals - 512.2.1 Natural Gas Fields - 631.1 Fluid Flow, General - 804.2 Inorganic Compounds - 931.1 Mechanics - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 67. On the robustness of stability of state-variable feedback system with the original system's gain varied

Zhang, Zi-xu (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 42-45, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** According to the matrix theory and root locus method, the paper studied the robustness problem for SISD state variable feedback system when the original system's gain varied. Supposing the sign  $a_i$  ( $i = 0, 1, \dots, n-1$ ) denotes the coefficients of the characteristic equation of the original system, and  $d_i$  denotes the coefficients of the expected characteristic equation of the closed loop system,  $a_{11}$  and  $a_{00}$  are the necessary and sufficient conditions for the second order system to keep stable when the gain of the original system varies, and  $a_{ii}$  are the necessary conditions for the high order system to keep stable. When designing a state-variable feedback system, the above mentioned conditions must be satisfied, otherwise the actual system will be unstable.

**Main heading:** Robustness (control systems)

**Controlled terms:** Closed loop control systems - Control system analysis - Feedback control - Gain control - Matrix algebra - Root loci - System stability

**Uncontrolled terms:** State variable feedback systems

**Classification Code:** 731.1 Control Systems - 731.3 Specific Variables Control - 921.1 Algebra

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 68. Experimental study of electrical-chemical production approach for improvement of EOR at different stages of oil-field development

Zhang, N. (1); Wun, X. (1); Yun, J. (1)

**Source:** *Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97*, p 7.33-7.38, 1997; **Conference:** Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97, October 7, 1997 - October 10, 1997; **Publisher:** Int Acad Publ

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The electrical-chemical production approach is a new method for enhancing oil production and recovery which is based on the process of electrical-chemical and electrical-dynamically reaction within the porous medium of a reservoir under the application of direct-electrical field. In this paper, dynamic displacement experiments using reservoir cores, simulated oil mixed by crude oil and kerosene, salt water and surfactants were performed to investigate the effect of electrical field applied to the cores on the oil recovery at different time period and conditions of using and no-using surfactants in the injected fluids. The experimental results showed that there is a relationship between the increment of oil recovery of the tested core and the time stages of the electrical field applied to the core. Before the injected water did not break through the production end of the core, the effect of the electrical action stages on the EOR was not obvious, and as the injected water broke through the production end of the core, the improved degree of oil recovery gradually decreased with the delay of the electrical action stages, which means that the suitable time period of electrical field applied is at the stage that water-broke through in the production wells. The investigations also showed that when the injected water contained a selected surfactant at a designed concentration, the EOR would be increased. These experimental results would be useful for oil industry to apply the new method for improving the recovery of the oil field. (3 refs)

**Main heading:** Oil well production

**Controlled terms:** Crude petroleum - Electric field effects - Enhanced recovery - Kerosene - Oil well testing - Surface active agents

**Uncontrolled terms:** Electric chemical production

**Classification Code:** 511.1 Oil Field Production Operations - 512.1 Petroleum Deposits - 513.3 Petroleum Products - 701.1 Electricity: Basic Concepts and Phenomena - 803 Chemical Agents and Basic Industrial Chemicals

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 69. Mathematical simulation for sandstone formation damage with pores plugging during waterflooding

Pu, Ch. (1); Zhou, F. (1)

**Source:** *Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97*, p 6.34-6.38, 1997; **Conference:** Proceedings of the 1997 International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, ISMNP'97, October 7, 1997 - October 10, 1997; **Publisher:** Int Acad Publ

**Author affiliation:** (1) Xi'an Petroleum Inst, Shaanxi, China

**Abstract:** In this paper, the principles of colloid chemistry and hydrodynamic were used to describe the 3 - D dynamic characteristics of the formation pores construction changes and its permeability decrease. A new mathematical simulation method was introduced. Some important results were obtained. These results were used to develop the temporarily screening technique of drilling fluid for protection of formation from damage and good practical results were obtained in Tuha oil fields operation. (14 refs)

**Main heading:** Oil well flooding

**Controlled terms:** Colloid chemistry - Drilling fluids - Hydrodynamics - Mathematical models - Mechanical permeability - Porosity

**Uncontrolled terms:** Pore structure - Porous formations

**Classification Code:** 511.1 Oil Field Production Operations - 511.2 Oil Field Equipment - 631.1.1 Liquid Dynamics - 801.3 Colloid Chemistry - 921 Mathematics - 931.2 Physical Properties of Gases, Liquids and Solids

**Treatment:** Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 70. On the object-oriented technique for the development of software

Han, Jianning (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 5, p 33-35, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Traditional data-oriented and procedure-oriented software design method takes the data and the procedure as independent objects, which ignores the internal relations between them. The different programs must thus be designed for the same processing to different data formats or for the different processings to the same data format, and the share property of software is poor. It is difficult to improve the software quality and productivity. The essential difference between object-oriented method and traditional data-oriented and procedure-oriented method is in that the former makes programmers break away from the trammels of data format and procedure, and use the object and class that it supplies to conveniently combine the software compositions that can be reused. This paper introduces the distinguishing feature of object-oriented method, then discusses its effects on improving software quality and productivity. (3 refs)

**Main heading:** Object oriented programming

**Controlled terms:** Computer software - Data processing - Software engineering

**Uncontrolled terms:** Procedure oriented method - Software productivity - Software quality - Traditional data oriented method

**Classification Code:** 723.1 Computer Programming

**Treatment:** Applications (APP) - General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 71. Research and development status of boron-crosslinked water-base fracturing fluid

Guan, Zhong-yuan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 53-56, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The paper reviews the research and development status of boron-crosslinked waterbase fracturing fluid at home and abroad, laying stress on the external boron crosslinking mechanism research by using nuclear magnetic resonance technique and the results obtained. It also introduced the delayed crosslinking mechanism and the advantages of organic boron-complexed crosslinker. The viscoelastic property and the determination of boron-crosslinked fracturing fluid, and the latest achievements of gel breaker - encapsulated gel breaker. Some important researches and developing direction are presented. (14 refs)

**Main heading:** Fracturing fluids

**Controlled terms:** Boron - Complexation - Crosslinking - Encapsulation - Nuclear magnetic resonance spectroscopy - Reaction kinetics - Viscoelasticity

**Uncontrolled terms:** Gel breakers - Water based fracturing fluids

**Classification Code:** 421 Strength of Building Materials; Mechanical Properties - 511.1 Oil Field Production Operations - 549.3 Nonferrous Metals and Alloys excluding Alkali and Alkaline Earth Metals - 802.2 Chemical Reactions

**Treatment:** General review (GEN) - Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 72. Mechanismic study on the generation of O<sub>2</sub><sup>-</sup> in oxygen-saturated aqueous solution of Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>

Wang, Yu-kun (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 49-52, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** The mechanism of generating superoxide radicals (O<sub>2</sub><sup>-</sup>) from oxygen in alkaline aqueous solution of Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> was studied. The spectrum determination of ESR and UV implied a single electron transfer from SO<sub>2</sub><sup>-</sup> anion radicals to molecular oxygen. It was found that the stability of O<sub>2</sub><sup>-</sup> in aqueous solution of Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> depends on PH. It was estimated that (O<sub>2</sub><sup>-</sup>) was less than 10<sup>-3</sup> mol·dm<sup>-3</sup> in the solution oxygenated once, and the total amount of O<sub>2</sub><sup>-</sup> generated in the solution oxygenated continuously depends on that of SO<sub>2</sub><sup>-</sup> in the same solution. The dynamics of both generation and decay of O<sub>2</sub><sup>-</sup> in the system is also discussed. (11 refs)

**Main heading:** Gas generators

**Controlled terms:** Charge transfer - Electron spin resonance spectroscopy - Free radicals - Oxygen - pH effects - Reaction kinetics - Sodium compounds - Solutions - Thermodynamic stability - Ultraviolet spectroscopy

**Uncontrolled terms:** Oxygen generation - Oxygenation - Self spinning capture

**Classification Code:** 522 Gas Fuels - 801 Chemistry - 802.1 Chemical Plants and Equipment - 804 Chemical Products Generally - 804.2 Inorganic Compounds - 931.3 Atomic and Molecular Physics

**Treatment:** Experimental (EXP)

**Database:** Compendex

**Data Provider:** Engineering Village

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### 73. Petroleum geologic features of Tarim Basin

Zhao, Jing-zhou (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 8-15, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Tarim Basin is a superimposed and composite basin of numerous proto-type basins composed of the Paleozoic cratonic basins and Meso-Cenozoic foreland basins. It has undergone many tectonic movements and 7 evolutionary stages. Three major strata of source rocks are found-that is, the Cambrian-Ordovician, Carbonic-Permian and Triassic-Jurassic. Multiple and deep buried rich reservoir rocks are also developed together with 5 associated reservoir-cap rocks. The oil, gas and water are complicated in their properties and the oil/gas pools are rich and varied in their types. Both oil and gas are rich in this basin and the gas pools discovered are dominated by condensed gas. The oil and gas are not only of continental genesis but also of marine genesis; the oil pools are mainly of marine genesis, whereas the gas pools are mainly of continental genesis. Most of the pools are found to be middle to small sized and are characterized by deep burying, lower richness and high productivity. There are several petroleum systems in the basin and the pools formed in multiple ages; the oil and gas have experienced several times of migration and re-accumulation. Still, the distribution of oil and gas in Taim Basin is very complicated and is controlled by many factors, which increases the difficulty of petroleum exploration. (3 refs)

**Main heading:** Oil bearing formations

**Controlled terms:** Crude petroleum - Natural gas - Petroleum geology - Petroleum reservoirs - Rocks - Tectonics

**Uncontrolled terms:** Condensed gas - Marine genesis - Oil and gas reservoirs - Source reservoir cap assemblage - Tarim basin

**Classification Code:** 481.1 Geology - 512.1.1 Oil Fields - 522 Gas Fuels - 523 Liquid Fuels

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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### 74. Parallel computation of electrostatic field of a lightning arrester

Wang, Shishan (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 3, p 35-38, 1997; **Language:** Chinese; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Based on the analysis of the electrostatic field of the lightning arrester, a parallel algorithm named 'even-odd parallel algorithm' is put forward, which is very suitable for running on CPU parallel computers. A practical computation example shows that this algorithm has high computation efficiency, and can be easily spreaded in other fields of numerical computation. Lastly, the distribution of the electrostatic field of an umbrella shaped lightning arrester is given. The standards used to judge the design quality of lightning arresters are put forward for the first time, which provides a theoretical basis for designing lightning arresters. (2 refs)

**Main heading:** Electric fields

**Controlled terms:** Calculations - Computers - Lightning protection - Parallel algorithms - Static electricity

**Uncontrolled terms:** Even odd parallel algorithm - Lightning arrester - Parallel computer

**Classification Code:** 701.1 Electricity: Basic Concepts and Phenomena - 723 Computer Software, Data Handling and Applications - 921 Mathematics

**Treatment:** Applications (APP) - Theoretical (THR)

**Database:** Compendex

**Data Provider:** Engineering Village

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### 75. Development of management information system of science and technology

Tian, Dang-hong (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 1, p 46-48, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** Starting from the practical needs of science and technology management, the authors designed eight functional blocks: projects assigned by the higher authorities, projects contracted with other units, achievements in scientific research, patents, academic exchanges, management of experts, management of official documents and system maintenance. With the help of the data bank, this system can offer timely, exact and wide-range information service to the vast management personnel of science and technology. It can easily process and make various report forms of plans, achievements, thesis, expenditure statistics and so on. With the advantages of wide range information, complete functions, rapid speed of looking up and convenient operation, this system will free the management personnel of science and technology from the miscellaneous routine work, greatly reducing labour intensity, shortening working hours and improving efficiency. It will play a good role in rapidly providing large amount of accurate information to the leaders at all levels when they make decisions. (3 refs)

**Main heading:** Decision support systems

**Controlled terms:** Database systems - Information management - Information retrieval systems - Information services - Project management - Research and development management

**Uncontrolled terms:** Science and technology management

**Classification Code:** 723 Computer Software, Data Handling and Applications - 723.3 Database Systems - 901.3 Engineering Research - 903 Information Science - 903.3 Information Retrieval and Use - 912.2 Management

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 76. On the construction of campus computer networks

Dang, Qi-min (1)

**Source:** *Xi'an Shiyou Xueyuan Xuebao/Journal of Xi'an Petroleum Institute (Natural Science Edition)*, v 12, n 2, p 43-46, 1997; **ISSN:** 10015361; **Publisher:** Xi'an Petroleum Institute

**Author affiliation:** (1) Xi'an Petroleum Inst, Xi'an, China

**Abstract:** In view of the actual situation of our institute, this paper puts forward some views concerning the principles of constructing a campus networks, the choice of plans, the interconnection of the networks, the division and isolation of the sub-networks, the development of resources and software and the management of the campus networks as well. (3 refs)

**Main heading:** Computer networks

**Controlled terms:** Computer software - Data communication systems - Interfaces (computer) - Management - Societies and institutions

**Uncontrolled terms:** Campus computer networks

**Classification Code:** 722.2 Computer Peripheral Equipment - 722.4 Digital Computers and Systems - 723.2 Data Processing and Image Processing - 901.1.1 Societies and Institutions - 912.2 Management

**Treatment:** General review (GEN)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 77. Strange repeller induced by dynamical discontinuity

Qu, Shi-Xian ; He, Da-Ren

**Source:** *Wuli Xuebao/Acta Physica Sinica*, v 46, n 7, p 1311, 1997; **Language:** Chinese; **ISSN:** 10003290; **Publisher:** Science Press

**Author affiliation:** (1) Department of Basic Courses, Xi'an Petroleum Institute, Xi'an 710065, China (2) Department of Physics, Teachers College, Yangzhou University, Yangzhou 225002, China

**Abstract:** Employing a kind of piece-wise linear map with a hole, we show that "hole-induced crisis" is a result of the emergence of a "strange repeller due to discontinuity". The strange repeller forces the iteration orbit to escape from the original chaotic attractor. Thus the attractor suddenly expands. We have proved that the lifetime of iterations in original attractor is inversely proportional to the escaping ratio, which enables us to obtain the dependence of the mean lifetime on the control parameter analytically. (12 refs)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 78. Chromatic classes of certain 2-connected $(n, n + 2)$ -graphs II (Open Access)

Chen, X.E. ; Ouyang, K.Z.

**Source:** *Discrete Mathematics*, v 172, n 1-3, p 31-38, Aug 10 1997; **ISSN:** 0012365X; **DOI:** 10.1016/S0012-365X(96)00265-8; **Publisher:** Elsevier

**Author affiliation:** (1) Department of Mathematics, Northwest Normal University, Lanzhou, 730070, Gansu, China (2) Department of Basic Courses, Xi'an Petroleum Institute, Xi'an, 710061, Shaanxi, China

**Abstract:** Let  $S$  denote the class of 2-connected  $(n, n + 2)$ -graphs which have girth 5 and are not homeomorphic to  $K_4$ . Chromatic classes of graphs in  $S$  are determined in this paper. (6 refs)

**Open Access type(s):** All Open Access, Bronze

**Database:** Compendex

**Data Provider:** Engineering Village

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## 79. A multiple devil's staircase in a discontinuous map

Qu, Shi-Xian (1); Wu, Shunguang (2); He, Da-Ren (2, 3, 4, 5)

**Source:** *Physics Letters, Section A: General, Atomic and Solid State Physics*, v 231, n 3-4, p 152-158, July 7, 1997; **ISSN:** 03759601; **DOI:** 10.1016/S0375-9601(97)00300-9; **Publisher:** Elsevier

**Author affiliation:** (1) Department of Basic Courses, Xian Petroleum Institute, Xian 710065, China (2) Department of Physics, Northwestern University, Xian 710069, China (3) CCAST (World Laboratory), P.O. Box 8730, Beijing 100080, China (4) Department of Physics, Teachers College, Yangzhou University, Yangzhou 225002, China (5) Institute of Theoretical Physics, Academia Sinica, Beijing 100080, China

**Abstract:** This letter reports the specific phase-locking property of a 1-d map that includes two discontinuous regions. The devil's staircase observed in the system loses monotonicity, self-similarity, and the "Farey tree rule" for description of the plateau length distribution. However this staircase is composed of many conventional devil's staircases that have all three characteristics. © 1997 Published by Elsevier Science B.V. (25 refs)

**Main heading:** Stairs

**Controlled terms:** Locks (fasteners)

**Uncontrolled terms:** Devil's staircase - Discontinuous map - Farey tree - Length distributions - Monotonicity - Phase-locking - Self-similarities

**Classification Code:** 402 Buildings and Towers

**Funding Details:** Number: -, Acronym: NSFC, Sponsor: National Natural Science Foundation of China;

**Funding text:** The work is supported by Chinese National Science Foundation. The authors want to express their gratitude to Professor E.J. Ding for his very important suggestions and calculations.

**Database:** Compendex

**Data Provider:** Engineering Village

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## 80. Analysis of general second-order fluid flow in double cylinder rheometer

Huang, Junqi ; He, Guangyu ; Liu, Ciqun

**Source:** *Science in China, Series A: Mathematics, Physics, Astronomy*, v 40, n 2, p X7-190, 1997; **ISSN:** 10069283;

**Publisher:** Science in China Press

**Author affiliation:** (1) Department of Resources Sciences, Beijing Normal University, Beijing 100875, China (2) Department of Petroleum Engineering, Xi'an Petroleum Institute, Xi'an 730000, China (3) Inst. Porous Flow Fluid Mechanics, Chinese Academy of Sciences, Langfang 102801, China

**Abstract:** The fractional calculus approach in the constitutive relationship model of second-order fluid is introduced and the flow characteristics of the viscoelastic fluid in double cylinder rheometer are studied. First, the analytical solution of which the derivative order is  $1/2$  is derived with the analytical solution and the reliability of Laplace numerical inversion based on Crump algorithm for the problem is verified, then the characteristics of second-order fluid flow in the rheometer by using Crump method is analyzed. The results indicate that the more obvious the viscoelastic properties of fluid are, the more sensitive the dependence of velocity and stress on fractional derivative order is. (9 refs)

**Database:** Compendex

**Data Provider:** Engineering Village

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## 81. Statistical properties of type V intermittent diffusion

Wu, Shun-Guang (1); Zhao, Shao-You (1); Qu, Shi-Xian (2); Gao, Zhan-Hai (3); He, Da-Ren (4, 5, 6)

**Source:** *Chinese Physics Letters*, v 14, n 4, p 248-251, 1997; **ISSN:** 0256307X; **DOI:** 10.1088/0256-307X/14/4/003;

**Publisher:** IOP Publishing Ltd

**Author affiliation:** (1) Department of Physics, Northwest University, Xi'an 710069, China (2) Department of Basic Courses, Xi'an Petroleum Institute, Xi'an 710061, China (3) Department of Mathematics, Northwest University, Xi'an 710069, China (4) CCAST (World Laboratory), P. O. Box 8730, Beijing 100080, China (5) Department of Physics, Teachers College, Yangzhou University, Yangzhou 225002, China (6) Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing 100080, China

**Abstract:** In an unbounded system type Vintermittency turns into an intermittent diffusion. The velocity autocorrelation function, its power spectrum  $S(\#)$ , and the mean-square displacements  $\#2(t)$  for the iterations inside channel are calculated both analytically and numerically. The diffusion as contrast with the conventional types of intermittent diffusion, is similar to a normal type. © 1997 by Allerton Press, Inc. (8 refs)

**Main heading:** Diffusion

**Controlled terms:** Autocorrelation

**Uncontrolled terms:** Mean-square displacement - Power-spectra - Statistical properties - Unbounded systems - Velocity autocorrelation functions

**Classification Code:** 921 Mathematics

**Database:** Compendex

**Data Provider:** Engineering Village

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