

1. Determination of trace vanadium in crude oil and diesel oil by catalytic spectrophotometry

Liu, Shu-Ren (1); Ren, Xiao-Juan (1); He, Qing-Yi (1)

Source: *Shiyou Xuebao, Shiyou Jiagong/Acta Petrolei Sinica (Petroleum Processing Section)*, v 19, n 4, p 52-56, August 2003; **Language:** Chinese; **ISSN:** 10018719; **Publisher:** Science Press

Author affiliation: (1) Dept. of Chem. and Chem. Eng., Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: A method of catalytic spectrophotometry for determination of trace vanadium in crude oil and diesel oil is described. The oxidation of calcon-carboxylic acid sodium salt (CR) by hydrogen peroxide is a slow process, and vanadium has a catalytic effect on the reaction rate. The reaction was traced spectrophotometrically by measuring the decrease in absorbance at 535 nm. Beer's Law is obeyed in the range of V content from 0 to 16 µg/l. The influence of 15 foreign ions was detected. The method was applied to determine trace vanadium (10-100 ng/g) in crude oil and diesel oil, the maximum relative standard deviation was 5.3% and the recoveries were 94.6% and 88.2%, respectively. (7 refs)

Main heading: Crude petroleum

Controlled terms: Catalysis - Diesel fuels - Hydrogen peroxide - Sodium compounds - Spectrophotometry - Vanadium

Uncontrolled terms: Calconcarboxylic acid sodium salt - Catalytic kinetic spectrophotometry - Determination - Race vanadium

Classification Code: 512.1 Petroleum Deposits - 741.3 Optical Devices and Systems - 804 Chemical Products Generally - 941 Acoustical and Optical Measuring Instruments

Treatment: Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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2. Petroleum resin prepared from catalytic cracking fraction of waste polystyrene

Li, Ju-Yuan (1)

Source: *Shiyou Xuebao, Shiyou Jiagong/Acta Petrolei Sinica (Petroleum Processing Section)*, v 19, n 4, p 98-101, August 2003; **Language:** Chinese; **ISSN:** 10018719; **Publisher:** Science Press

Author affiliation: (1) Dept. of Chem. and Chem. Eng., Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: Waste polystyrene (PS) was catalytically cracked at the temperature range of 350-450°C. The product was purified and fractionated, the 134-154°C fraction of which was polymerized in the presence of anhydrous AlCl₃ (0.4%-0.6%) as the catalyst and at the temperature of 40-60°C for 4-6 h. The catalyst was removed after polymerization by water-washing, and the unpolymersized portion was distilled out. The IR spectrum of the amber petroleum resin prepared from waste PS was similar to that of the market available petroleum resin made from C9, The yield of the obtained petroleum resin was nearly 20.3%-23.8% with softening point of 72.5°C, colourity of 11-12 and pH of 6.39. (5 refs)

Main heading: Crude petroleum

Controlled terms: Catalytic cracking - Cracking (chemical) - Polymerization - Polystyrenes - Resins - Temperature

Uncontrolled terms: Petroleum resin - Waste polystyrene

Classification Code: 512.1 Petroleum Deposits - 641.1 Thermodynamics - 802.2 Chemical Reactions - 815 Polymers and Polymer Science

Treatment: Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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3. The reliability and self-diagnosis of sensors in a multisensor data fusion diagnostic system

Wang, Jiangping (1); Wang, Hongfei (1)

Source: *Journal of Testing and Evaluation*, v 31, n 5, p 370-377, September 2003; **ISSN:** 00903973; **Publisher:** American Society for Testing and Materials

Author affiliation: (1) Mechanical Departments, Xian Petroleum Institute, Xi'an, Shaaxi 710065, China

Abstract: Any error in a data fusion system that is used to diagnose and detect machine faults, especially an error in sensor measurement information, will result in an incorrect diagnostic conclusion. The accuracy and reliability of sensor measurement is a prerequisite for reducing the uncertainty of the fusion system and accurately diagnosing system faults. The measurement error of the multisensor and the degree of reliability of the detecting system can be determined by a multisensor consistency check. In this paper, we use the "probability distance measure" to determine

the compatibility of multisensor information and to ensure that the measurements represent the same target (or state). We show our experimental results, which demonstrate a good result. (8 refs)

Main heading: Sensor data fusion

Controlled terms: Algorithms - Error analysis - Mathematical models - Matrix algebra - Numerical methods - Probability distributions - Reliability - Sensors

Uncontrolled terms: Multisensor consistency check - Probability distance measure - Sensor measurement

Classification Code: 723.2 Data Processing and Image Processing - 732.2 Control Instrumentation - 921.1 Algebra - 921.6 Numerical Methods - 922.1 Probability Theory - 922.2 Mathematical Statistics

Treatment: Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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4. Implementation of traffic lights control based on petri nets

Lin, Li (1); Nan, Tang (2); Xiangyang, Mu (2); Fubing, Shi (2)

Source: *IEEE Conference on Intelligent Transportation Systems, Proceedings, ITSC*, v 2, p 1087-1090, 2003, *Proceedings of the 2003 IEEE International Conference on Intelligent Transportation Systems, ITSC 2003*; **ISBN-10:** 0780381254; **DOI:** 10.1109/ITSC.2003.1252653; **Article number:** 1252653; **Conference:** 2003 IEEE International Conference on Intelligent Transportation Systems, ITSC 2003, October 12, 2003 - October 15, 2003; **Sponsor:** CAS Key Laboratory of Complex Systems and Intelligence Science; IEEE Council on Intelligent Transportation Systems; **Publisher:** Institute of Electrical and Electronics Engineers Inc.

Author affiliation: (1) Xi'an Shtyou University, Xi'an, Shaanxi; 710065, China (2) Industrial Automation Department, Xi'an Shiyou University, Xi'an, Shaanxi; 710065, China

Abstract: Traffic lights are commonly used in the intersection in urban areas nowadays. In fact a network of the traffic lights regulating the urban vehicle can be viewed as a complex discrete-event system (DES). It is proved that Petri nets are one of the methodologies for modeling, analyzing and controlling on DES. A new approach via programmable logic controller (PLC) and Petri net synthesis is proposed in this paper. Firstly we described the typical urban traffic lights control using Petri nets. Having compared with three methods for Petri nets realization, the best implementation method of the traffic lights control - system was one which made with PLC. The Sequential Function Chart (SFC) of the PLC system is also given in the thesis. The result shown that the method has many advantages at improving flexibility and troubleshoots of system and reducing the difficulty in its realization. © 2003 IEEE. (12 refs)

Main heading: Discrete event simulation

Controlled terms: Traffic control - Petri nets - Controllers - Computer circuits - Traffic signals

Uncontrolled terms: Logic control - Net synthesis - New approaches - Programmable logic controllers (PLC) - Sequential function charts - Traffic light - Troubleshoots - Urban vehicles

Classification Code: 432.4 Highway Traffic Control - 721.3 Computer Circuits - 732.1 Control Equipment - 921.4 Combinatorial Mathematics, Includes Graph Theory, Set Theory

Database: Compendex

Data Provider: Engineering Village

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5. Effect of dilatancy on rock fracture parameters

Li, Dang (1); Tian, Hejin (1); Zhang, Jie (1); Wang, Aihua (1)

Source: *Yanshilixue Yu Gongcheng Xuebao/Chinese Journal of Rock Mechanics and Engineering*, v 22, n 9, p 1417-1420, September 2003; **Language:** Chinese; **ISSN:** 10006915; **Publisher:** Academia Sinica

Author affiliation: (1) Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: Very high stress and dilatancy occurs at the tip end of fracture during hydraulic fracturing. The effect of dilatancy is discussed on the rock fracture parameters. Based on the knowledge of mechanism of compression-induced dilatancy, the rock porosity (ϕ), permeability (K), elastic modulus (E), fracture length (Xf), width (wwn) are changed during hydraulic fracturing. The rock mechanics related problems are discussed in detail. (12 refs)

Main heading: Hydraulic fracturing

Controlled terms: Elastic moduli - Mechanical permeability - Porosity - Rock mechanics

Uncontrolled terms: Compression-induced dilatancy - Rock dilatancy - Rock fracture parameters

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 483.1 Soils and Soil Mechanics - 502.1 Mine and Quarry Operations - 512.1.2 Petroleum Deposits : Development Operations - 931.1 Mechanics - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: Applications (APP)

Database: Compendex

Data Provider: Engineering Village
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6. Exact Solution of Two Layer Reservoir with Crossflow under Constant Pressure Condition

Sun, HeDong (1); Liu, Lei (1); Zhou, Fangde (1); Gao, Chengtai (2)

Source: *Proceedings of the SPE Latin American and Caribbean Petroleum Engineering Conference*, p 361-366, 2003;

DOI: 10.2118/81043-ms; **Conference:** Eighth Latin American and Caribbean Petroleum Engineering Conference, April 27, 2003 - April 30, 2003; **Publisher:** Society of Petroleum Engineers (SPE)

Author affiliation: (1) Xi'an Jiaotong University, China (2) Xi'an Petroleum University, China

Abstract: The max effective hole-diameter mathematical model describing flow of slightly compressible fluid through two-layer reservoir with crossflow is solved rigorously. The model considers all layers open to a single well that flows at a constant wellbore pressure. The effect of formation damage is included in the model. The exact solutions are expressed in terms of ordinary Bessel functions by using the method of Laplace transform. The numerical computation of these solutions is made by Stehfest numerical inversion method. The new model is numerically stable when the skin is positive and negative. The effect of the reservoir parameters such as permeability, vertical permeability, skin, outer boundary conditions and storativity on the layer production rate and total rate were investigated. These results can be used to analyse unsteady flow test of production under the constant pressure condition. (9 refs)

Main heading: Petroleum reservoirs

Controlled terms: Bessel functions - Boundary conditions - Compressibility of liquids - Compressible flow - Gravitational effects - Laplace transforms - Mathematical models - Mechanical permeability - Unsteady flow - Viscosity - Well pressure

Uncontrolled terms: Cross flows

Classification Code: 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 512.2.2 Natural Gas Deposits: Development Operations - 631.1.1 Liquid Dynamics - 921 Mathematics - 921.3 Mathematical Transformations - 931.2 Physical Properties of Gases, Liquids and Solids - 931.5 Gravitation, Relativity and String Theory

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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7. Laser-based system for highway pavement texture measurement

Xiangyang, Mu (1); Lin, Li (1); Nan, Tang (1); Liu, Ce (2); Xiuhan, Jiang (1)

Source: *IEEE Conference on Intelligent Transportation Systems, Proceedings, ITSC*, v 2, p 1559-1562, 2003,

Proceedings of the 2003 IEEE International Conference on Intelligent Transportation Systems, ITSC 2003; **ISBN-10:**

0780381254; **DOI:** 10.1109/ITSC.2003.1252746; **Article number:** 1252746; **Conference:** 2003 IEEE International

Conference on Intelligent Transportation Systems, ITSC 2003, October 12, 2003 - October 15, 2003; **Sponsor:** CAS Key Laboratory of Complex Systems and Intelligence Science; IEEE Council on Intelligent Transportation Systems;

Publisher: Institute of Electrical and Electronics Engineers Inc.

Author affiliation: (1) Industrial Automation Department, Xi'an Shiyu University, Xi'an, Shaanxi; 710065, China (2) Department of Electrical and Computer Engineering, University of Houston, Houston; TX; 77004-4005, United States

Abstract: The texture of highway is one of the major factors that impact the road quality. The traditional method is to use skid truck to measure skid number, but in the course of the measurement its speed is limited and frequent traffic slow down is inevitable. This paper presented a highway pavement texture detection system using position-sensitive device (PSD) with a laser transmitter. As one of non-destructive test tools, the laser texture sensor that can run at 178kHz allows high-speed measurement, and is very sensitive to macro and micro texture. In order to reduce the influences from surrounding area we have designed a PID compensation circuit to help improving accuracy of the system. The outcomes of several prototype pavement texture devices have proved the measurement system's feasible and effective. A measurement system with high speed, high accuracy and low-cost is obtained. © 2003 IEEE. (10 refs)

Main heading: Nondestructive examination

Controlled terms: Pavements - Three term control systems

Uncontrolled terms: Compensation circuits - High speed measurements - Laser triangulation - Laser-based systems - Measurement system - Non-destructive test - Position sensitive device - Texture measurement

Classification Code: 731.1 Control Systems

Database: Compendex

Data Provider: Engineering Village

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8. Temperature-compensated stress measurement method with a single fibre Bragg grating

Sun, An (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Guo, Tuan (1); Chen, Chang-Yong (1); Liu, Yong-Fang (1)

Source: *Guangxue Jishu/Optical Technique*, v 29, n 5, p 534-536+540, September 2003; **Language:** Chinese; **ISSN:** 10021582; **Publisher:** Optical Technique

Author affiliation: (1) Optical Fiber Sensing Lab., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: The strain and temperature responses of fibre Bragg grating(FBG) are analyzed. The dual-peak response of a single FBG that stuck to a cantilever that has asymmetric structure is observed. The results show that a single fibre Bragg grating produce two reflecting peaks because of the different strain distribution in the asymmetric cantilever. In experiment, when load changes from 0 to 200 g, the distance between two peaks increase 0.16 nm. And the changes of distance between two peaks are linear to the changes of load while temperature doesn't affect the distance between two peaks. So it can solve the problem of cross-sensitivity of temperature and stress and eliminate the error induced by the shift of temperature when this kind of structure is used to coat the FBG. (11 refs)

Main heading: Fiber optic sensors

Controlled terms: Cantilever beams - Diffraction gratings - Fiber Bragg gratings - Lasers - Strain - Temperature

Uncontrolled terms: Cross sensitivity - Strain response - Temperature compensated

Classification Code: 408.2 Structural Members and Shapes - 641.1 Thermodynamics - 714.3 Waveguides - 741.1.2 Fiber Optics - 744.1 Lasers, General

Treatment: Applications (APP)

Database: Compendex

Data Provider: Engineering Village

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9. Novel fiber Bragg grating dual-parameter sensor for measurement of strain and temperature

Chen, Chang-Yong (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Fu, Hai-Wei (1); Guo, Tuan (1); Sun, An (1)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 14, n 8, p 787-790, August 2003; **Language:** Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Optical Fiber Sensing Lab., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: A new scheme of fiber Bragg grating assisted by optical fiber microbending for measurement of strain and temperature was proposed. The simultaneous measurement of strain and temperature was realized by a special sensor . It is experimentally indicated that this sensor can solve the problem of dual-parameter cross-sensitivity effectively, and has the merit of highly linear response and easily making. (8 refs)

Main heading: Sensors

Controlled terms: Bending (deformation) - Fiber Bragg gratings - Parameter estimation - Sensitivity analysis - Strain - Temperature

Uncontrolled terms: Dual parameter sensing - Optical fiber microbending

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 641.1 Thermodynamics - 732.2 Control Instrumentation - 741.3 Optical Devices and Systems - 921.6 Numerical Methods

Treatment: Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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10. Manhole detection and location for urban pavement

Nan, Tang (1); Xiangyang, Mu (1); Lin, Li (1); Liu, Ce (2); Xiuhan, Jiang (1)

Source: *IEEE Conference on Intelligent Transportation Systems, Proceedings, ITSC*, v 2, p 1552-1555, 2003, *Proceedings of the 2003 IEEE International Conference on Intelligent Transportation Systems, ITSC 2003*; **ISBN-10:** 0780381254; **DOI:** 10.1109/ITSC.2003.1252744; **Article number:** 1252744; **Conference:** 2003 IEEE International Conference on Intelligent Transportation Systems, ITSC 2003, October 12, 2003 - October 15, 2003; **Sponsor:** CAS Key Laboratory of Complex Systems and Intelligence Science; IEEE Council on Intelligent Transportation Systems; **Publisher:** Institute of Electrical and Electronics Engineers Inc.

Author affiliation: (1) Industrial Automation Department, Xi'an Shiyou University, Xi'an, Shaanxi; 710065, China (2) Department of Electrical and Computer Engineering, University of Houston, Houston; TX; 77004-4005, United States

Abstract: An underground practical sensing system was developed to detect covered-over manholes along the sewer lines under the urban pavement. The sensor head of the system is composed of a sonde and some transmitting and receiving circuits. Coil-type antennas has been designed and implemented based on the induction principle and numerical simulation. The transmitting circuits generate excitation current for the transmitting antennas, and the signal

received by the receiving antennas is processed with the receiving circuits. A windows-based application software can calculate phase shift as well as amplitude value of the receiving signal. And there is also a distance-measurement device to provide information about the location of the covered-over or missing manholes. Satisfactory- results have been achieved from the field tests of the system in actual manholes. For loop antennas with a spacing of 0.5m, the system has a phase resolution of about 1° and an amplitude resolution of about 0.5%. © 2003 IEEE. (12 refs)

Main heading: Data acquisition

Controlled terms: Application programs - Loop antennas - Pavements - Receiving antennas

Uncontrolled terms: Excitation currents - Induction principles - Manhole detect - Phase resolution - Sensing systems - Transmitting antenna - Transmitting circuit - Urban pavement

Classification Code: 723 Computer Software, Data Handling and Applications - 723.2 Data Processing and Image Processing

Database: Compendex

Data Provider: Engineering Village

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11. Simultaneous discriminating measurement of temperature and strain by using fibre grating sensing technology

Sun, An (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Guo, Tuan (1); Chen, Chang-Yong (1)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 14, n 2, p 210-214, February 2003; **Language:**

Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Optical Fibre Grating Sensing Lab., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: We analyse the response-principle of fibre grating to temperature and strain theoretically, and schemes for discriminating measurement of temperature and strain in different ways were presented. (20 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Fiber optic sensors - Strain measurement - Temperature measurement

Uncontrolled terms: Crosstalk sensitivity - Discriminating measurement

Classification Code: 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems - 943.2 Mechanical Variables Measurements - 944.6 Temperature Measurements

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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12. Study on HNR in transmitted sound signals

Zhao, Shouguo (1); Bu, Fanliang (2); Sun, Yihe (1); Han, Chengcai (3)

Source: *NLP-KE 2003 - 2003 International Conference on Natural Language Processing and Knowledge Engineering, Proceedings*, p 580-584, 2003, *NLP-KE 2003 - 2003 International Conference on Natural Language Processing and Knowledge Engineering, Proceedings*; **ISBN-10:** 0780379020, **ISBN-13:** 9780780379022; **DOI:** 10.1109/

NLPKE.2003.1275972; **Article number:** 1275972; **Conference:** International Conference on Natural Language Processing and Knowledge Engineering, NLP-KE 2003, October 26, 2003 - October 29, 2003; **Sponsor:** Beijing Network and Multimedia Lab; Chinese Association for Artificial Intelligence; Chinese Information Processing Society of China; Chinese Institute of Electronics; et al.; Natural Science Foundation of China; **Publisher:** Institute of Electrical and Electronics Engineers Inc.

Author affiliation: (1) Institute of Microelectronics, Tsinghua University, Beijing; 100084, China (2) Nation Laboratory on Machine Processing, Peking University, Beijing; 100871, China (3) Mechanical Engineering College, Xi'an Shiyong University, Xi'an; 71 0065, China

Abstract: In this article, the estimation of Harmonic to Noise Ratio (HNR) in transmitted sound signals with wavelet transform was proposed. When subjects phonate sustained vowels in breathy, falsetto, leakage and pressed mode in normal loudness, the HNR in human voice and transmitted sound signals was estimated and compared. The results indicated that the HNR in transmitted sound signals could accurately image vocal folds vibration characteristics. It would be one of useful measurements for clinical laryngeal disease diagnosis. © 2003 IEEE. (15 refs)

Main heading: Wavelet transforms

Controlled terms: Diagnosis - Acoustic noise

Uncontrolled terms: Harmonic to noise ratios - Human voice - Laryngeal disease - Sound signal - Vocal folds vibrations - Wavelet transform

Classification Code: 461.6 Medicine and Pharmacology - 751.4 Acoustic Noise - 921.3 Mathematical Transformations

Funding Details: Number: 30070212,60236020,60275018, Acronym: -, Sponsor: -;

Database: Compendex

Data Provider: Engineering Village
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13. Research of temperature hysteresis rule on fiber Bragg gratings sensing

Guo, Tuan (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Sun, An (1); Chen, Chang-Yong (1)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 14, n 12, p 1281-1283, December 2003; **Language:** Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Lab. of Optical Fiber Sensing, Sci. Sch., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: An experimental setup of fiber Bragg gratings (FBG) temperature sensing was designed and founded. The temperature characteristics of FBGs in the range of 20°C-260°C was studied. The hysteresis phenomenon of FBGs response to temperature change was found, and the temperature hysteresis was reduced with temperature increasing. The methods of eliminating temperature hysteresis error were given. (7 refs)

Main heading: Temperature measuring instruments

Controlled terms: Fiber Bragg gratings - Fiber optic sensors

Uncontrolled terms: Hysteresis rule - Temperature sensing

Classification Code: 741.1.2 Fiber Optics - 931.2 Physical Properties of Gases, Liquids and Solids - 944.5 Temperature Measuring Instruments

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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14. Study of Vibration Control and Measurement of Truss Structure with Piezoelectric Materials

Wang, F.M. (1); Zhixin, Hu (2)

Source: *Proceedings of the International Symposium on Test and Measurement*, v 1, p 707-710, 2003; **Publisher:** International Academic Publishers

Author affiliation: (1) North China Institute of Technology, Taiyuan, Shanxi 030051, China (2) Xi'an Petroleum University, Xi'an, Shaanxi 710065, China

Abstract: This paper presents a new kind of method for active damping control and Measurement of intelligent truss structure using a piezoelectric active member by a local integral force and velocity feedback. The feedback control law has good stability and robustness, in which the active member is controlled with the compounded integral force and velocity feedback on the voltage applied to it. Control experiments are conducted on a space truss structure to show that the presented method is very effective in damping vibration response of the structure. The simulation results show that the control energy can be decreased greatly by using the optimized actuators to control the vibration of smart trusses. (5 refs)

Main heading: Vibration control

Controlled terms: Damping - Piezoelectric materials - Trusses - Vibration measurement

Uncontrolled terms: Truss structure

Classification Code: 408.2 Structural Members and Shapes - 708.1 Dielectric Materials - 731.3 Specific Variables Control - 931.1 Mechanics - 943.2 Mechanical Variables Measurements

Treatment: Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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15. Exact solution and typical curve for infinite three layers reservoir with crossflow

Sun, He-Dong (1); Liu, Lei (1); Zhou, Fang-De (1); Gao, Cheng-Tai (2)

Source: *Kuangwu Yanshi*, v 23, n 1, p 101-104, March 2003; **Language:** Chinese; **ISSN:** 10016872; **Publisher:** Kuangwu Yanshi

Author affiliation: (1) St.Key Lab.Multiph.Flow Power Eng., Xi'an 710049, China (2) Department of Petroleum Engineering, Xi'an Petroleum Institute, Xi'an 710065, China

Abstract: The maximum effective hole-diameter mathematical model describing flow of slightly compressible fluid through a three-layer crossflow reservoir is solved rigorously with consideration of wellbore storage and different skin factors. The numerical computation of these solutions is made by Crump numerical inversion method and the behavior of the systems is studied as a function of various reservoir parameters. The new model is compared with the real wellbore radii model. The new model is numerically stable when the skin is positive and negative. The real wellbore

radii model is numerically stable when the skin is positive. Because the curves explicitly include skin factor and other reservoir parameters, the techniques is expected to be more accurate than the real wellbore radii model. The automatic history matching technique has made it possible to accurately determine individual layer properties and wellbore parameters. (10 refs)

Main heading: Petroleum reservoirs

Controlled terms: Boreholes - Compressible flow - Computational methods - Mathematical models - Solutions

Uncontrolled terms: Wellbore storage

Classification Code: 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 631.1.1 Liquid Dynamics - 721.1 Computer Theory, Includes Formal Logic, Automata Theory, Switching Theory, Programming Theory - 801 Chemistry - 921 Mathematics

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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16. Equivalent load density models for feeders

Liu, Jian (1); Bi, Peng-Xiang (2); Wu, Xiao-Meng (3)

Source: *Zhongguo Dianji Gongcheng Xuebao/Proceedings of the Chinese Society of Electrical Engineering*, v 23, n 1, p 70-73+111, January 2003; **Language:** Chinese; **ISSN:** 02588013; **Publisher:** Chinese Society of Electrical Engineering

Author affiliation: (1) Xi'an Univ. of Sci. and Technol., Xi'an 710075, China (2) Xi'an Jiaotong Univ., Xi'an 710049, China (3) Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: An equivalent load density model of a feeder line is presented. Six fundamental load distribution patterns are put forward. By solving voltage drop and power loss equations of the feeder line, characteristic values together with the corresponding similarity coefficients for the six load distribution patterns are obtained respectively. Weighting values for the six load distribution patterns are calculated, respectively. Consequently, voltage drop and line loss can be acquired without measuring the data of each load on the feeder line. Based on above method, a discrete equivalent load density model is developed. Examples are also given with comparison with other analysis results, such as the power flow calculation without simplification, loads evenly distributed model and lumped equivalent load model, showing the feasibility of the proposed approach. (7 refs)

Main heading: Electric load flow

Controlled terms: Electric losses - Mathematical models - Voltage measurement

Uncontrolled terms: Feeder automation - Load density - Power flow analysis

Classification Code: 701.1 Electricity: Basic Concepts and Phenomena - 706.1 Electric Power Systems - 921 Mathematics - 942.2 Electric Variables Measurements

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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17. Pressure pipe leakage detection based on the acoustic emission and wavelet packet theory

Wang, Qianlong (1); Feng, Quanke (1); Qu, Zhan (2); Panaerhan (3)

Source: *Hsi-An Chiao Tung Ta Hsueh/Journal of Xi'an Jiaotong University*, v 37, n 5, p 515-518, May 2003;

Language: Chinese; **ISSN:** 0253987X; **Publisher:** Xi'an Jiaotong University

Author affiliation: (1) Sch. of Energy and Power Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Dept. of Petroleum Eng., Xi'an Petroleum Inst., Xi'an 710000, China (3) R and D Dept., Kingdream Co., China

Abstract: Acoustic emission and wavelet packet theory are adopted to detect the pressure leakage location accurately. First, wavelet packet decomposition and reconstruction methods are used to make the multi-resolution analysis of the sampling data of the two acoustic emission sensors in the time-frequency domains; then different frequency bands are analyzed with correlation method, correlation coefficients are compared and the time point corresponding with the maximum correlation coefficient is selected as delay-time. Through solving the location equation, the leakage position is obtained at finally. It is approved that the proposed method has higher antinoise ability and higher signal-to-noise ratio than the direct correlation method. Subsequently, measurement experiment and analysis indicate that the accuracy of this method is higher than 94%, and the method can be widely used in pressure pipe leakage detection and online monitoring. (6 refs)

Main heading: Pipelines

Controlled terms: Acoustic emissions - Leak detection - Leakage (fluid) - Pressure - Signal to noise ratio

Uncontrolled terms: Pressure pipe - Wavelet packet theory

Classification Code: 619.1 Pipe, Piping and Pipelines - 751.2 Acoustic Properties of Materials - 931.1 Mechanics

Treatment: Applications (APP) - Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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18. Mathematical modeling of gas release through holes in pipelines

Yuhu, Dong (1); Huilin, Gao (2); Jing'en, Zhou (1); Yaorong, Feng (3)

Source: *Chemical Engineering Journal*, v 92, n 1-3, p 237-241, April 15, 2003; **ISSN:** 13858947; **DOI:** 10.1016/S1385-8947(02)00259-0; **Publisher:** Elsevier

Author affiliation: (1) Material Sciences and Eng. Inst., Xi'an Jiaotong University, Xi'an, 710049, China (2)

Department of Mechanical Engineering, Xi'an Petroleum Institute, Xi'an, 710065, China (3) Tubular Goods of Research Center, CNPC, Xi'an 710065, China

Abstract: A mathematical model of accidental gas release in long transmission pipelines is given by using of computational fluid mechanics. It was found that the existing hole model is suitable for predicting gas release through a small punctured hole while the other existing pipe model is suitable to predict the gas release through a complete break in the pipe. In this paper, a new model was proposed for the hole that lies between the above two situations. The results of an example show that when the initial inside pipe pressure is higher than 1.5MPa, the mass of gas released during sonic flow is more than 90% of the total mass of gas released. The total average release rate could be substituted by 30% of initial release rate. This approximation would become more accurate with increasing of the initial inside pipe pressure. © 2002 Elsevier Science B.V. All rights reserved. (9 refs)

Main heading: Gas pipelines

Controlled terms: Approximation theory - Computational fluid dynamics - Mathematical models - Pressure effects

Uncontrolled terms: Sonic flow

Classification Code: 522 Gas Fuels - 619.1 Pipe, Piping and Pipelines - 723.5 Computer Applications - 921.6 Numerical Methods - 931.1 Mechanics

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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