

17th European Conference on the Mathematics of Oil Recovery (ECMOR XVII)

Online
14 - 17 September 2020

Volume 1 of 3

ISBN: 978-1-7138-2184-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2020) by the European Association of Geoscientists & Engineers (EAGE)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact by the European Association of Geoscientists & Engineers (EAGE)
at the address below.

European Association of Geoscientists & Engineers (EAGE)
PO Box 59
3990 DB Houten
The Netherlands

Phone: +31 88 995 5055
Fax: +31 30 634 3524

eage@eage.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

| | |
|--|-----|
| NUMERICAL EFFECTS OF FLUID FLOW MODELLING IN SURFACTANT CHEMICAL FLOODING..... | 1 |
| <i>O. Akinyele, K. Stephen</i> | |
| DISCRETE FRACTURE-MATRIX SIMULATIONS USING CELL-CENTERED NONLINEAR FINITE VOLUME METHODS | 22 |
| <i>W. Zhang, M. Al Kobaisi</i> | |
| HIGHER RESOLUTION HYBRID UNSTRUCTURED SPECTRAL FINITE-VOLUME METHODS FOR FLOW IN POROUS MEDIA..... | 45 |
| <i>Y. Xie, M. Edwards</i> | |
| THE IMPACT OF NUMERICAL DISCRETISATION ON THE CORRECT SIMULATION OF CO2 CONVECTIVE FLOW PATTERNS..... | 64 |
| <i>M. Awag, S. Ghanbari, E. Mackay</i> | |
| GLIMM AND FINITE VOLUME SCHEMES FOR POLYMER FLOODING MODEL WITH AND WITHOUT INACCESSIBLE PORE VOLUME LAW..... | 79 |
| <i>G. Dongmo, B. Braconnier, C. Preux, Q. Tran, C. Berthon</i> | |
| A SEMI-ANALYTICAL SOLUTION OF DIMETHYL ETHER ENHANCED WATER FLOODING..... | 100 |
| <i>P. Soleimani, M. Chahardowli, M. Simjoo</i> | |
| A MATHEMATICAL MODEL FOR SCALING AND WETTIBILITY ALTERATION IN ASP FLOODING..... | 113 |
| <i>G. Chen, X. Zhang, M. Ma, X. Su, K. Lu, C. Wei</i> | |
| UNISIM-III: BENCHMARK CASE PROPOSAL BASED ON A FRACTURED KARST RESERVOIR..... | 125 |
| <i>M. Correia, V. Botechia, L. Pires, V. Rios, S. Santos, V. Rios, J. Hohendorff, M. Chaves, D. Schiozer</i> | |
| STUDYING THE EFFECTS OF HETEROGENEITY ON DISSOLUTION PROCESSES USING OPERATOR BASED LINEARIZATION AND HIGH-RESOLUTION LIDAR DATA | 139 |
| <i>S. De Hoop, D. Voskov, G. Bertotti</i> | |
| MODELING TRANSPORT AND RETENTION: SIMULTANEOUS EVALUATION OF DISPERSION AND RETENTION PARAMETERS..... | 152 |
| <i>J. Rios, A. Santos, S. Lima</i> | |
| A SIMPLIFIED MECHANISTIC POPULATION BALANCE MODEL FOR FOAM ENHANCED OIL RECOVERY (EOR) | 163 |
| <i>L. Ding, D. Guerillot</i> | |
| HIGH-RESOLUTION HYDRAULIC FRACTURE NETWORK MODELING ON ADAPTIVE PEBI GRIDS | 182 |
| <i>D. Filippov, B. Vasekin, D. Maksimov, D. Mitrushkin, A. Roshchektaev</i> | |

| | |
|--|-----|
| IDENTIFICATION OF CRITICAL OPERATIONAL UNCERTAINTIES IN FIELD DEVELOPMENT PLANNING USING STOCHASTIC GRADIENTS | 193 |
| <i>E. Barros, R. Hanea, L. Hustoft, O. Leeuwenburgh, R. Fonseca</i> | |
| ASSESSMENT OF INTERACTION BETWEEN NATURAL AND TECNOGENIC FRACTURES DURING MULTI-STAGE FRACTURING | 205 |
| <i>A. Gula, A. Bochkarev, A. Vishnivetskiy, A. Glazyrina, R. Nikitin</i> | |
| GPU-BASED PARALLEL ALGORITHM FOR SOLVING MULTIPHASE, MULTICOMPONENT FLUID FILTRATION PROBLEM..... | 214 |
| <i>T. Imankulov, D. Akhmed-Zaki, B. Daribayev, O. Turar</i> | |
| HISTORY MATCHING UNDER UNCERTAIN GEOLOGIC SCENARIOS WITH VARIATIONAL AUTOENCODERS | 223 |
| <i>A. Jiang, B. Jafarpour</i> | |
| GMRES BASED NUMERICAL SIMULATION OF MULTICOMPONENT MULTIPHASE FLOW IN POROUS MEDIA ON LUNA FRAGMENTED PROGRAMMING SYSTEM | 237 |
| <i>N. Kassymbek, B. Matkerim, D. Lebedev, T. Imankulov, D. Akhmed-Zaki</i> | |
| INVESTIGATION OF THE ACCURACY AND EFFICIENCY OF THE OPERATOR-BASED LINEARIZATION THROUGH AN ADVANCED RESERVOIR SIMULATION FRAMEWORK | 247 |
| <i>A. Al-Jundi, L. Li, A. Abushaikhaa</i> | |
| AN ADVANCED PARALLEL FRAMEWORK FOR RESERVOIR SIMULATION WITH MIMETIC FINITE DIFFERENCE DISCRETIZATION AND OPERATOR-BASED LINEARIZATION | 257 |
| <i>L. Li, A. Abushaikhaa</i> | |
| EXPERIMENTAL EVALUATION OF SEALING EFFECT OF NANO CALCIUM CARBONATE BLOCKING AGENT ON SHALE MICROFRACTURE | 269 |
| <i>R. Yang, P. Li, Y. Zhou</i> | |
| AN INVESTIGATION INTO THE UPSCALING OF MINERAL DISSOLUTION FROM THE PORE TO THE CORE SCALE..... | 279 |
| <i>A.N. Faris, J. Maes, H.P. Menke</i> | |
| MODIFIED RAND ALGORITHMS FOR MULTIPHASE GEOCHEMICAL REACTIONS | 294 |
| <i>F. De Azevedo Medeiros, W. Yan, E.H. Stenby</i> | |
| ALBITE-ANORTHITE SYNERGISTIC EFFECT ON THE PERFORMANCE OF NANOFUID ENHANCED OIL RECOVERY | 309 |
| <i>R. Nguete, E.O. Ansah, K. Nchimi Nono, K. Sasaki</i> | |
| CALCULATION OF WELL PRODUCTIVITY INDEX IN STOCHASTIC POROUS MEDIA..... | 320 |
| <i>D. Posvyanskii, A. Novikov</i> | |
| FRACTURED RESERVOIR CHARACTERIZATION IN BRAZILIAN PRE-SALT USING PRESSURE TRANSIENT ANALYSIS WITH A PROBABILISTIC APPROACH..... | 329 |
| <i>C.K. Quispe Cerna, D.J. Schiozer, G. Soares Oliveira, A. De Lima, R. B. Z. L. Moreno</i> | |
| ANALYTICAL PORE NETWORK APPROACH (APNA) FOR RAPID ESTIMATION OF CAPILLARY PRESSURE BEHAVIOUR IN ROCK SAMPLES..... | 345 |
| <i>H. Rabbani, D. Guerillot, T. Seers</i> | |

| | |
|--|-----|
| MODELLING POROSITY AND PERMEABILITY ALTERATION DURING CO ₂ WAG INJECTION IN CARBONATE OIL RESERVOIRS | 356 |
| <i>A. Ribeiro, L. Guimarães, E. Mackay</i> | |
| A NOVEL METHOD FOR QUICKLY OBTAINING SRV IN MULTI-STAGE FRACTURING RESERVOIRS WITH DIFFERENT FRACTURING RADII | 370 |
| <i>W. Shi, Y. Yao, M. Wang, J. Zhang</i> | |
| A MODELING WORKFLOW FOR GEOLOGICAL CARBON STORAGE INTEGRATED WITH COUPLED FLOW AND GEOMECHANICS SIMULATIONS | 382 |
| <i>J. Torres, I. Bogdanov, M. Boisson</i> | |
| FRAGMENTED ALGORITHM FOR CONSTRUCTION OF ADAPTED STRUCTURED COMPUTATIONAL GRIDS BASED ON INVERTED BELTRAMI EQUATION | 401 |
| <i>O. Turar, D. Akhmed-Zaki, G. Khakimzyanov, B. Daribayev, D. Lebedev</i> | |
| A COUPLED GEOMECHANICS AND FLOW MODEL FOR ENHANCED GAS RECOVERY AND CO ₂ STORAGE IN SHALE RESERVOIRS | 410 |
| <i>X. Yan, L. Liu, J. Yao, D. Fan</i> | |
| UPSCALING LOW SALINITY WATER FLOODING IN HETEROGENOUS RESERVOIRS..... | 426 |
| <i>H. Al-Ibadi, K. Stephen, E. Mackay</i> | |
| ADAPTIVE MOMENT ESTIMATION FRAMEWORK FOR WELL PLACEMENT OPTIMIZATION | 448 |
| <i>Y. Arouri, M. Sayyafzadeh</i> | |
| STATISTICAL MODEL AND EXPERIMENTAL STUDY OF OIL VISCOSITY REDUCTION AND ROCK WETTABILITY ALTERATION INDUCED BY NANOPARTICLES | 463 |
| <i>M. Bagheri Vanani, S.A. Tabatabaei-Nezhad, E. Khodapanah</i> | |
| OPTIMIZATION OF RESERVOIR SURVEILLANCE STRATEGIES UNDER UNCERTAINTY: AN APPLICATION TO THE DESIGN OF SPARSE MONITORING SURVEYS | 473 |
| <i>E. Barros, O. Leeuwenburgh</i> | |
| ANALYTICAL PRODUCTION OPTIMIZATION WITH MODIFIED NPV: APPLICATION TO 2D GAS-CONE RESERVOIRS..... | 484 |
| <i>A. Bizzi, E. Fortaleza, F.P. Munerato</i> | |
| DATA-DRIVEN MODELS BASED ON FLOW DIAGNOSTICS..... | 496 |
| <i>M. Borregales, O. Møyner, S. Krogstad, K. Lie</i> | |
| FEATURE SELECTION FOR RESERVOIR ANALOGUES SIMILARITY RANKING AS MODEL-BASED CAUSAL INFERENCE..... | 507 |
| <i>A. Voskresenskiy, N. Bukhanov, Z. Filippova, R. Brandao, V. Segura, E. Vital Brazil</i> | |
| USING MACHINE LEARNING METHODS FOR OIL RECOVERY PREDICTION | 516 |
| <i>B. Daribayev, D. Akhmed-Zaki, T. Imankulov, Y. Nurakhov, Y. Kenzhebek</i> | |
| HOW DOES THE DEFINITION OF THE OBJECTIVE FUNCTION INFLUENCE THE OUTCOME OF HISTORY MATCHING?..... | 529 |
| <i>G. Eremyan, I. Matveev, G. Shishaev, V. Rukavishnikov, V. Demyanov</i> | |
| INCORPORATING UNCERTAINTIES IN A MODEL-BASED DATA-DRIVEN FRAMEWORK USING TRANSFER LEARNING | 543 |
| <i>T. Van de Poll, E. Barros, W. Langenkamp, R. Fonseca</i> | |

| | |
|--|-----|
| ESTIMATION OF THE CHANCE OF SUCCESS OF A FOUR-DIMENSIONAL SEISMIC PROJECT FOR A DEVELOPED OIL FIELD | 558 |
| <i>A.T.F.S. Gaspar, S.M.G. Santos, C.J. Ferreira, A. Davolio, D.J. Schiozer</i> | |
| CONSISTENT UPDATE OF WELL PATH, GRID STRUCTURE AND GRID MODEL PARAMETERS USING AN ITERATIVE ENSEMBLE SMOOTHER | 579 |
| <i>J. Saetrom, L. Gourc</i> | |
| USING SVD ALGORITHM TO SOLVE OIL DISPLACEMENT PROBLEM | 598 |
| <i>T. Imankulov, D. Akhmed-Zaki, B. Matkerim, L. Zhumakhan</i> | |
| ENGINEERING DESIGN OF NEURAL NETWORK ARCHITECTURES FOR ESTIMATION OF INTER-WELL CONNECTIVITY AND PRODUCTION PERFORMANCE..... | 607 |
| <i>J. Yu, A. Jahandideh, B. Jafarpour</i> | |
| STOCHASTIC CLOSED-LOOP RESERVOIR MANAGEMENT UNDER UNCERTAIN PREDICTIONS AND DEVELOPMENT PLANS..... | 617 |
| <i>A. Jahandideh, B. Jafarpour</i> | |
| THE INFLUENCE OF THE PETROPHYSICAL PROPERTIES' HETEROGENEITY ON THE WELL TESTS INTERPRETATION RESULTS | 630 |
| <i>R. Khusainov, A. Nekrasov, C. Aitov</i> | |
| CUBE2VEC: SELF-SUPERVISED REPRESENTATION LEARNING FOR SUB-SURFACE MODELS | 645 |
| <i>P. Lang, T. Adeyemi, R. Schulze-Riegert</i> | |
| TWO-STAGE ENSEMBLE KALMAN FILTER APPROACH FOR DATA ASSIMILATION APPLIED TO FLOW IN FRACTURED MEDIA | 655 |
| <i>M. Liem, P. Jenny</i> | |
| ADAPTIVE NONLINEAR SOLVER FOR A DISCRETE FRACTURE MODEL IN OPERATOR-BASED LINEARIZATION FRAMEWORK | 669 |
| <i>K. Mansour Pour, D. Voskov</i> | |
| GEOLOGY REALISM CONTROL IN AUTOMATED HISTORY MATCHING..... | 687 |
| <i>I. Matveev, G. Shishaev, G. Eremyan, D. Konoshonkin, V. Demyanov, S. Kaygorodov</i> | |
| DATA-DRIVEN, PHYSICS-DRIVEN AND ANALYTIC MODELS FOR WATERFLOODING OPTIMISATION UNDER UNCERTAINTY | 696 |
| <i>D.L. Moreno Bedoya, G. Garcia</i> | |
| ACCOUNTING FOR MODEL DISCREPANCY IN UNCERTAINTY ANALYSIS BY COMBINING NUMERICAL SIMULATION AND BAYESIAN EMULATION TECHNIQUES | 707 |
| <i>H. Nandi Formentin, I. Vernon, M. Goldstein, C. Caiado, G. Avansi, D. Schiozer</i> | |
| A NOVEL APPROACH TO MULTILEVEL DATA ASSIMILATION..... | 734 |
| <i>M. Nezhadali, T. Bhakta, K. Fossum, T. Mannseth</i> | |
| A SURROGATE-BASED APPROACH TO WATERFLOOD OPTIMISATION UNDER UNCERTAINTY..... | 747 |
| <i>P. Ogbeiwi, K. Stephen, A. Arinkoola</i> | |

VOLUME 2

| | |
|--|-----|
| A BAYESIAN STATISTICAL APPROACH TO DECISION SUPPORT FOR TNO OLYMPUS WELL CONTROL OPTIMISATION UNDER UNCERTAINTY | 763 |
| <i>J. Owen, I. Vernon, R. Hammersley</i> | |
| APPLICATION OF SECTOR MODELING APPROACH IN A PROBABILISTIC STUDY OF A GIANT RESERVOIR | 790 |
| <i>L.O. Pires, V.E. Botechia, D. Schiozer</i> | |
| KOGEN-COMBINED KOVAL/GENTIL FRACTIONAL FLOW MODEL..... | 803 |
| <i>D. Santos Oliveira, B. Horowitz, J.A.R. Tueros</i> | |
| A DERIVATIVE-FREE TRUST-REGION ALGORITHM FOR WELL CONTROL OPTIMIZATION | 822 |
| <i>T. Silva, M. Bellout, C. Giuliani, E. Camponogara, A. Pavlov</i> | |
| TESTING OF VULKAN VISUALIZATION FOR GEO-MODELS ON MOBILE DEVICES AND DESKTOP SYSTEMS WITH RAY TRACING GPUS..... | 842 |
| <i>M. Mustafin, O. Turar, D. Akhmed-Zaki</i> | |
| LATTICE BOLTZMAN METHOD ASSISTING WAG HYSTERESIS AND TRAPPED NON-WETTING PHASE SIMULATIONS | 853 |
| <i>F. Munarin, H. Vasquez, S. Lucena</i> | |
| GAUSS-NEWTON TRUST REGION SEARCH OPTIMIZATION METHOD FOR LEAST SQUARES PROBLEMS WITH SINGULAR HESSIAN..... | 868 |
| <i>G. Gao, F. Saaf, J. Vink, M. Krymskaya, T. Wells</i> | |
| FAST ROBUST OPTIMIZATION USING MEAN FIELD BIAS CORRECTION..... | 891 |
| <i>L. Wang, D.S. Oliver</i> | |
| FLOW DIAGNOSTICS FOR MODEL ENSEMBLES | 923 |
| <i>F. Watson, S. Krogstad, K. Lie</i> | |
| DEEP-LEARNING INVERSION TO EFFICIENTLY HANDLE BIG-DATA ASSIMILATION: APPLICATION TO SEISMIC HISTORY MATCHING | 942 |
| <i>C. Xiao, A. Heemink, H. Lin, O. Leeuwenburgh</i> | |
| IMPROVING THE PREDICTIVE ABILITY OF A GEOMECHANICAL MODEL USING NEURAL NETWORKS (DEEP LEARNING)..... | 958 |
| <i>N. Zakharenko, A. Gula, A. Bochkarev, Y. Ovcharenko</i> | |
| OPTIMIZATION OF CO2 STORAGE UNDER GEOMECHANICAL RISK WITH COUPLED-PHYSICS MODELS | 972 |
| <i>F. Zheng, A. Jahandideh, B. Jha, B. Jafarpour</i> | |
| EXTENDED FINITE VOLUME METHOD (XFVM) FOR FLOW INDUCED TENSILE FAILURE IN FRACTURED RESERVOIRS | 983 |
| <i>A.A. Habibabadi, R. Deb, P. Jenny</i> | |
| PROJECTION-BASED EMBEDDED DISCRETE FRACTURE MODEL (PEDFM) ON CORNER-POINT GRID GEOMETRY FOR SUBSURFACE FLOW AND GEOTHERMAL MODELING..... | 994 |
| <i>M. HosseiniMehr, J.P. Piguave Tomala, C. Vuik, H. Hajibeygi</i> | |

| | |
|--|------|
| THE UNDRAINED SPLIT ITERATIVE COUPLING SCHEME IN FRACTURED PORO-ELASTIC MEDIA | 1010 |
| <i>T. Almani, K. Kumar</i> | |
| NOVEL STABILIZATIONS FOR A PIECEWISE CONSTANT LAGRANGIAN FORMULATION OF FRICTIONAL CONTACT MECHANICS WITH HYDRAULICALLY ACTIVE FRACTURES | 1021 |
| <i>A. Franceschini, N. Castelletto, J. White, R. Settgast, H. Tchelepi</i> | |
| MULTISCALE MATRIX-FRACTURE TRANSFER FUNCTIONS FOR NATURALLY FRACTURED RESERVOIRS USING AN ANALYTICAL DISCRETE FRACTURE MODEL..... | 1031 |
| <i>R. Hazlett, R. Younis</i> | |
| COUPLED FORWARD SIMULATION OF SEISMICITY: A STICK-SLIP MODEL FOR FRACTURES AND TRANSIENT GEOMECHANICS..... | 1049 |
| <i>Z. Han, G. Ren, R. Younis</i> | |
| TURBULENT FLOW EFFECTS IN A SLICKWATER FRACTURE PROPAGATION IN PERMEABLE ROCK | 1070 |
| <i>E. Kanin, D. Garagash , A. Osipov</i> | |
| PARTICLE TRANSPORT SCHEME FOR EMBEDDED DISCRETE FRACTURE MODELS..... | 1088 |
| <i>R. Monga, R. Deb, D.W. Meyer, P. Jenny</i> | |
| A ROBUST, MULTI-SOLUTION FRAMEWORK FOR WELL LOCATION AND CONTROL OPTIMIZATION | 1103 |
| <i>M. Salehian, M. Haghghat Sefat, K. Muradov</i> | |
| THE EXPRESS METHOD OF WELL-CONTROL OPTIMIZATION FOR THE ASSOCIATED GAS RECYCLING PROCESS..... | 1119 |
| <i>V. Babin, N. Glavnov, E. Shel</i> | |
| REFINED ENSEMBLE-BASED METHOD FOR WATERFLOODING PROBLEM WITH STATE CONSTRAINTS | 1141 |
| <i>J. Tueros, B. Horowitz</i> | |
| OPTIMIZING SEALING OF CO ₂ LEAKAGE PATHS WITH MICROBIALLY INDUCED CALCITE PRECIPITATION UNDER UNCERTAINTY..... | 1162 |
| <i>S. Tveit, P. Pettersson, D. Landa Marban</i> | |
| CONSISTENT FORMULATION AND ERROR STATISTICS FOR RESERVOIR HISTORY MATCHING | 1174 |
| <i>G. Evensen</i> | |
| SELECTING REPRESENTATIVE MODELS FOR ENSEMBLE-BASED PRODUCTION OPTIMIZATION IN CARBONATE RESERVOIRS WITH INTELLIGENT WELLS AND WAG INJECTION..... | 1196 |
| <i>S.M.G. Santos, A.A.S. Santos, D.J. Schiozer</i> | |
| WELL LOCATION OPTIMISATION BY USING SURFACE-BASED MODELLING AND DYNAMIC MESH OPTIMISATION..... | 1224 |
| <i>P. Salinas, C. Jacquemyn, C. Heaney, C. Pain, M. Jackson</i> | |
| GEOENGINEERING TOOL FOR FIELD DEVELOPMENT: A DECISION-MAKING TOOL FOR DEVIATED WELL PLACEMENT | 1234 |
| <i>S. Bouquet, A. Fornel</i> | |

| | |
|--|------|
| DISTRIBUTED QUASI-NEWTON DERIVATIVE-FREE OPTIMIZATION METHOD FOR OPTIMIZATION PROBLEMS WITH MULTIPLE LOCAL OPTIMA | 1249 |
| <i>G. Gao, Y. Wang, J. Vink, T. Wells, F. Saaf</i> | |
| AN AUTOMATIC WELL PLANNER FOR EFFICIENT WELL PLACEMENT OPTIMIZATION UNDER GEOLOGICAL UNCERTAINTY | 1271 |
| <i>B.S. Kristoffersen, T. Silva, M. Bellout, C.F. Berg</i> | |
| APPLICATION OF DIFFUSE SOURCE BASIS FUNCTIONS FOR IMPROVED NEAR WELL UPSCALING..... | 1287 |
| <i>C. Liu, K. Nunna, M.J. King</i> | |
| DYNAMIC SATURATION RECONSTRUCTION FOR MULTIPHASE FLOW BY TIME-OF-FLIGHT FILL FUNCTIONS | 1318 |
| <i>O. Møyner</i> | |
| COMPARISON BETWEEN ALGEBRAIC MULTIGRID AND MULTILEVEL MULTISCALE METHODS FOR RESERVOIR SIMULATION | 1337 |
| <i>H. Nilsen, A. Moncorgé, K. Bao, O. Møyner, K. Lie, A. Brodtkorb</i> | |
| FAST TIME-STEPPING SCHEME FOR STREAMLINE-BASED TRANSPORT SIMULATIONS | 1354 |
| <i>F. Keller, D. Meyer</i> | |
| FREE-SPACE WELL CONNECTION METHOD FOR EFFICIENT COUPLING OF WELLS AND GRID CELLS OF ARBITRARY GEOMETRY | 1363 |
| <i>R. Pecher</i> | |
| ADDITIVE SCHWARZ PRECONDITIONED EXACT NEWTON METHOD AS A NONLINEAR PRECONDITIONER FOR MULTIPHASE POROUS MEDIA FLOW..... | 1391 |
| <i>Ø. Klemetsdal, A. Moncorgé, O. Møyner, K. Lie</i> | |
| A NOVEL AND EFFICIENT PRECONDITIONER FOR SOLVING LAGRANGE MULTIPLIERS-BASED DISCRETIZATION SCHEMES FOR RESERVOIR SIMULATIONS | 1411 |
| <i>S. Nardean, M. Ferronato, A.S. Abushaikha</i> | |
| MACHINE-LEARNING INFORMED PREDICTION OF LINEAR SOLVER TOLERANCE FOR NON-LINEAR SOLUTION METHODS IN NUMERICAL SIMULATION | 1423 |
| <i>E. Oladokun, S. Sheth, T. Jönsthövel, K. Neylon</i> | |
| ALGEBRAIC WAVEFRONT PARALLELIZATION FOR ILU(0) SMOOTHING IN RESERVOIR SIMULATION | 1433 |
| <i>S. Gries</i> | |
| NON-LINEAR SOLVER OPTIMISATION FOR MULTIPHASE POROUS MEDIA FLOW BASED ON MACHINE LEARNING | 1450 |
| <i>V.L.S. Silva, P. Salinas, C.C. Pain, M.D. Jackson</i> | |
| ANALYSIS OF LOW SALINITY AND POLYMER SYNERGIES IN A DYNAMIC PORE-SCALE NETWORK SIMULATOR | 1464 |
| <i>E. David, S. McDougall, A. Boujelben</i> | |
| ON THE ROBUST VALUE QUANTIFICATION OF POLYMER EOR INJECTION STRATEGIES FOR BETTER DECISION MAKING | 1479 |
| <i>M. Oguntola, R. Lorentzen</i> | |

| | |
|--|------|
| A NOVEL NANOPARTICLE RETENTION MODEL IN POROUS MEDIA FOR IOR & EOR APPLICATIONS..... | 1504 |
| <i>H. Solano, M. Icardi, N. Bueno, J. Mejia</i> | |

| | |
|--|------|
| SCALING FOAM FLOW MODELS IN HETEROGENEOUS RESERVOIRS FOR A BETTER IMPROVEMENT OF SWEEP EFFICIENCY..... | 1514 |
| <i>F. Douarche, B. Braconnier, B. Bourbiaux</i> | |

VOLUME 3

| | |
|---|------|
| INCLUSION OF VARIABLE CHARACTERISTIC LENGTH IN MICROEMULSION FLASH CALCULATIONS | 1562 |
| <i>D. Magzymov, R.T. Johns</i> | |

| | |
|--|------|
| SIMULATION OF FOAM-ASSISTED CO ₂ STORAGE IN SALINE AQUIFERS | 1580 |
| <i>X. Lyu, D. Voskov, W. Rossen</i> | |

| | |
|---|------|
| COMPOSITIONAL MODELLING OF PETROLEUM RESERVOIRS AND SUBSURFACE CO ₂ STORAGE WITH THE MUFITS SIMULATOR..... | 1596 |
| <i>A. Afanasyev</i> | |

| | |
|---|------|
| IMPROVED EXTENDED BLACKOIL FORMULATION FOR CO ₂ EOR SIMULATIONS..... | 1609 |
| <i>T.H. Sandve, O. Sevareid, I. Aavatsmark</i> | |

| | |
|---|------|
| HUFF-N-PUFF (HNP) PILOT DESIGN IN SHALE RESERVOIRS USING DUAL-POROSITY, DUAL-PERMEABILITY COMPOSITIONAL SIMULATIONS | 1631 |
| <i>H. Hamdi, C.R. Clarkson, A. Esmail, M. Costa Sousa</i> | |

| | |
|---|------|
| IMPACTS OF GAS TRAPPING AND CAPILLARITY ON OIL RECOVERY BY NEAR-MISCIBLE CO ₂ -WAG | 1661 |
| <i>G. Wang, G. Pickup, K. Sorbie, E. Mackay, A. Skauge</i> | |

| | |
|---|------|
| HYDRO-MECHANICAL COUPLING FOR FLOW DIAGNOSTICS: A FAST SCREENING METHOD TO ASSESS GEOMECHANICS ON FLOW FIELD DISTRIBUTIONS..... | 1672 |
| <i>L. Gutierrez Sosa, S. Geiger, F. Doster</i> | |

| | |
|---|------|
| MULTI-SCALE NONLINEAR MODELING OF SUBSURFACE ENERGY STORAGE: CYCLIC LOADING WITH INELASTIC CREEP DEFORMATION..... | 1691 |
| <i>K. Ramesh Kumar, H. Hajibeygi</i> | |

| | |
|--|------|
| MULTISCALE EXTENDED FINITE ELEMENT METHOD FOR DEFORMABLE FRACTURED MEDIA | 1704 |
| <i>F. Xu, H. Hajibeygi, B. Sluys</i> | |

| | |
|--|------|
| FLUID-ROCK GEOMECHANICAL INTERACTIONS: MICRO-MECHANICS AND FRACTURED RESERVOIRS..... | 1716 |
| <i>G. Couples</i> | |

| | |
|--|------|
| MODELING OF WATER-INDUCED FRACTURE GROWTH PRESSURE USING POROELASTIC APPROACH..... | 1737 |
| <i>P. Kabanova, E. Shel</i> | |

| | |
|---|------|
| HIGH PERFORMANCE FRAMEWORK FOR MODELLING OF COMPLEX SUBSURFACE FLOW AND TRANSPORT APPLICATIONS..... | 1749 |
| <i>M. Khait, D. Voskov, R. Zaydullin</i> | |

| | |
|--|------|
| UPSCALING OF NANOPARTICLE RETENTION RATE FOR SINGLE-WELL APPLICATIONS FROM PORE-SCALE SIMULATIONS | 1767 |
| <i>N. Bueno, M. Icardi, F. Municchi, H. Solano, J. Mejía</i> | |
| PORE-SCALE MODELING OF MICROBIAL GROWTH IN A TWO-PHASE SATURATED POROUS MEDIUM..... | 1782 |
| <i>G. Strobel, B. Hagemann, M. Wirth, L. Ganzer</i> | |
| EFFECTS OF LUMPING ON THE NUMERICAL SIMULATION OF THERMAL-COMPOSITIONAL-REACTIVE FLOW IN POROUS MEDIA | 1796 |
| <i>M. Cremon, M. Gerritsen</i> | |
| IMPORTANCE OF IMPROVING SUPPORT MATERIAL REMOVAL FROM POLYJET 3D-PRINTED POROUS MODELS | 1806 |
| <i>S. Lopez-Saavedra, S. Ishutov, R. Chalaturnyk, G. Zambrano-Narvaez</i> | |
| A Bayesian Statistical Approach to Decision..... | 1817 |
| <i>R. Bordas, J.R. Heritage, M.A. Javed, G. Peacock, T. Taha, P. Ward, I. Vernon, R.P. Hammersley</i> | |
| OPTIMIZATION OF WAG IN REAL GEOLOGICAL FIELD USING MACHINE LEARNING AND NATURE-INSPIRED ALGORITHMS | 1837 |
| <i>M. Nait Amar, A. Jahanbani Ghahfarokhi</i> | |
| LARGE-SCALE FIELD DEVELOPMENT OPTIMIZATION USING A TWO-STAGE STRATEGY | 1851 |
| <i>Y. Nasir, O. Volkov, L.J. Durlofsky</i> | |
| OPTIMIZING LOW SALINITY WATERFLOODING WITH CONTROLLED NUMERICAL INFLUENCE OF PHYSICAL MIXING CONSIDERING UNCERTAINTY | 1875 |
| <i>L. Ladipo, M. Blunt, P. King</i> | |
| BAYESIAN INFERENCE OF COVARIANCE PARAMETERS IN SPECTRAL APPROACH TO GEOSTATISTICAL SIMULATION..... | 1898 |
| <i>N. Ismagilov, I. Azangulov, V. Borovitskiy, M. Lifshits, P. Mostowsky</i> | |
| HISTORY MATCHING OF TIME-LAPSE DEEP ELECTROMAGNETIC TOMOGRAPHY WITH A FEATURE ORIENTED ENSEMBLE-BASED APPROACH..... | 1908 |
| <i>K. Katterbauer, A. Marsala, M. Maucec, Y. Zhang, I. Hoteit</i> | |
| NOVEL ENSEMBLE DATA ASSIMILATION ALGORITHMS DERIVED FROM A CLASS OF GENERALIZED COST FUNCTIONS..... | 1924 |
| <i>X. Luo</i> | |
| APPLICATION OF DYNAMIC PARAMETRIZATION ALGORITHM FOR NON-INTRUSIVE HISTORY MATCHING APPROACHES | 1956 |
| <i>A. Mukhin, M. Elizarev, N. Voskresenskiy, A. Khlyupin</i> | |
| EFFICIENT ADJOINT-BASED WELL-PLACEMENT OPTIMIZATION USING FLOW DIAGNOSTICS PROXIES..... | 1969 |
| <i>S. Krogstad, H. Møll Nilsen</i> | |
| HISTORY MATCHING WITH GENERATIVE ADVERSARIAL NETWORKS..... | 1983 |
| <i>S. Mohd Razak, B. Jafarpour</i> | |

| | |
|---|------|
| CONDITIONING SURFACE-BASED GEOLOGICAL MODELS TO WELL DATA USING NEURAL NETWORKS..... | 2000 |
| <i>Z. Titus, C. Pain, C. Jacquemyn, P. Salinas, C. Heaney, M. Jackson</i> | |
| DEEP-LEARNING-BASED 3D GEOLOGICAL PARAMETERIZATION AND FLOW PREDICTION FOR HISTORY MATCHING..... | 2012 |
| <i>M. Tang, Y. Liu, L. Durlofsky</i> | |
| PHYSICS BASED DEEP LEARNING FOR NONLINEAR TWO-PHASE FLOW IN POROUS MEDIA..... | 2030 |
| <i>O. Fuks, H. Tchelepi</i> | |
| MACHINE LEARNING FOR FAST EOR FLOODING SIMULATION..... | 2040 |
| <i>B. Samson, C. Marooney, S. Godefroy, S. Sheth</i> | |
| EVALUATION OF A DATA-DRIVEN FLOW NETWORK MODEL (FLOWNET) FOR RESERVOIR PREDICTION AND OPTIMIZATION..... | 2053 |
| <i>A. Kier, O.P. Lødøen, W. De Bruin, E. Barros, O. Leeuwenburgh</i> | |
| NONLINEAR STATE CONSTRAINTS HANDLING IN WATERFLOODING OPTIMIZATION THROUGH REDUCED ORDER MODELS..... | 2071 |
| <i>A. Souza, A. Castro, M. Dall'Aqua, J. Tueros, B. Horowitz, E. Gildin</i> | |
| TWO-STAGE SCENARIO REDUCTION PROCESS FOR AN EFFICIENT ROBUST OPTIMIZATION..... | 2090 |
| <i>S.K. Mahjour, A.A.D.S. Dos Santos, M.G. Correia, D.J. Schiozer</i> | |
| PHYSICS-BASED DATA-DRIVEN MODEL FOR PRODUCTION FORECAST..... | 2115 |
| <i>A. Blinovs, M. Khait, D. Voskov</i> | |
| DEEP-DCA A NEW APPROACH FOR WELL HYDROCARBON PRODUCTION FORECASTING..... | 2131 |
| <i>D. Busby</i> | |
| DISCONTINUOUS CONTROL VOLUME FINITE ELEMENT METHOD FOR MULTIPHASE FLOW IN POROUS MEDIA ON CHALLENGING MESHES..... | 2141 |
| <i>J. Al Kubaisy, H. Osman, P. Salinas, C. Pain, M. Jackson</i> | |
| COMPARING THREE DFN SIMPLIFICATION STRATEGIES FOR TWO-PHASE FLOW APPLICATIONS..... | 2152 |
| <i>P. Anquez, M. Zakari, G. Caumon</i> | |
| AN EFFICIENT IMPLEMENTATION OF THE DISCONTINUOUS GALERKIN METHOD FOR MULTIPHASE FLOWS THROUGH HETEROGENEOUS POROUS MEDIA..... | 2173 |
| <i>N. Dashtbesh, B. Noetinger, G. Enchéry</i> | |
| MODELING COMPRESSIBLE GAS FLOW IN ANISOTROPIC RESERVOIRS USING A NONLINEAR FINITE VOLUME METHOD..... | 2186 |
| <i>W. Zhang, M. Al Kobaisi</i> | |
| ADAPTIVE MESH REFINEMENT FOR THERMAL-REACTIVE FLOW AND TRANSPORT ON UNSTRUCTURED GRIDS..... | 2200 |
| <i>E. Jones, S. De Hoop, D. Voskov</i> | |
| MODIFIED PEACEMAN CORRECTION FOR IMPROVED CALCULATION OF POLYMER INJECTIVITY IN COARSE GRID NUMERICAL SIMULATIONS..... | 2217 |
| <i>I. Tai, A. Muggeridge, M.A. Giddins</i> | |

| | |
|---|------|
| A MULTI-TIMESTEP DOMAIN DECOMPOSITION METHOD APPLIED TO POLYMER FLOODING..... | 2236 |
| <i>R.S. Tavares, R.B.D. Santos, S.A.D. Lima, A. Dos Santos, J.H.D.S. Mariano</i> | |
| NUMERICAL MODELLING OF CO ₂ MIGRATION THROUGH FAULTED STORAGE STRATA WITH A NEW ASYNCHRONOUS FE-FV COMPOSITIONAL SIMULATOR..... | 2252 |
| <i>Q. Shao, S. Matthai</i> | |
| TWO-PHASE DARCY FLOWS IN FRACTURED AND DEFORMABLE POROUS MEDIA, CONVERGENCE ANALYSIS AND ITERATIVE COUPLING | 2268 |
| <i>F. Bonaldi, K. Brenner, J. Droniou, R. Masson</i> | |
| QUASI-K-ORTHOGONAL GRID GENERATION FOR QUASI-POSITIVE CVD-MPFA..... | 2288 |
| <i>S. Manzoor, M. Edwards, A. Dogru</i> | |

Author Index