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Joint Seminar

Global Optimization to Predict the Production of Water and Oil Reservoirs

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Abstract • In order to predict production of a reservoir, water or oil, it is necessary to simulate the flux which implies the characterization of the porous media of the site under study. This characterization is performed through the solution of an inverse parameter identification optimization problem, to find the coefficients (parameters) of the flux equations, using data on the pressure and saturation at observations wells. These coefficients are related to the porosity and permeability of the porous media of the reservoir. This inverse problem is ill-posed and may have several optimal local solutions with good match to the data, requiring a global optimization method, capable of finding these solutions. Also, due to the ill-posedness, a regularization method is needed to prevent measurements and numerical error propagation. In this work we will present the deterministic parallel tunneling global optimization method, capable to characterize oil reservoirs (History matching), in reasonable computational time, producing a set of scenarios of production. Numerical results on synthetic realistic examples will be given.

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The Speaker • *Dr. Susana Gomez is a researcher at the Institute of Research in Applied Mathematics and Systems IIMAS, at the national University of Mexico UNAM. She has B.Sc. In Chemical Engineering at the Universidad Iberoamericana, Mexico City, and a Masters and a Ph.D. in Applied Mathematics from Imperial College of Science and Technology, University of London, England. Her main scientific interest is the developmentof new global optimization methods (sequential and parallel) as well as numerical methods to be used in industrial aplications. More specifically, she has been recently working on parameter identification inverse optimization problems, in particular in the modelization and characterization of water and oil reservoirs. She has also worked in simulation and optimization of chemical processes related problems. She has directed or participated in research projects with the Mexican Institute of Petroleum IMP, with the Mexican Petroleum Company PEMEX, with Polymer industry Industrias Resistol, with the French Institute of Petroleum and with the Mexican Institute of Water Technology IMTA. She has directed a research consortium called OPTIMA with the petroleum companies TOTAL (french) and AGIP (italian). She has published more than 50 papers, edited two scientific books and produced 11 industrial reports. She has more than 250 citations to her work.*