MODELO GENETICO PARA LA SIMULACION DE YACIMIENTOS DE GAS

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ABSTRACT: A general application model applied to gas reservoir simulation merging elements of the evolutionary and object-oriented paradigms is shown. The model works in three ways: 1. Make an adaptive grid partition of the 3D structure based on a non linear function. 2. Solve the non-linear algebraic equation systems in each block, which are generated for the gas properties calculation, taking advantage of the object-oriented programming and genetic algorithms, this method is mainly advised when there are problems with traditional methods like Newton Method. 3. find out an adaptive pressure distribution through of the reservoir based on a double exponential function, this distribution is more real and easy to understand and interpret that those gotten by others models. Finally, the model integrate the three sub-models to solve the non-linear equations system depicting the gas flow through the gas reservoir. This model exposes a novel representation method of individuals specifying the reservoir, equations, blocks, etc., and their components as object classes, following a complex system simulation model which take advantage of a genetic algorithm developed in oo-programming and fed with a population of those classes to get a suitable solution. Expansion of the model to others more complex problems in different areas and the introduction of the genetic programming is discussed.

Key words. Gas Reservoir Simulation, Complex Systems, Genetic Algorithms, Object Oriented Modeling.