

An efficient geometry-based optimization approach for well placement in oil fields

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This study aims at introducing a problem-specific modified Genetic Algorithm (GA) approach for optimal well placement in oil fields. The evolution method used in this algorithm includes a novel genetic operator named “Similarity Operator” alongside the standard operators (i.e. Mutation and Crossover). The role of the proposed operator is to find promising solutions that share similar features with the current elite solution in the population. For the well placement problem in oil fields, these features include the new well location with respect to pre-located wells and the porosity value at the proposed location. The presented approach highlights the importance of the interaction between the nominated location and the pre-located wells in the reservoir. In addition, it enables systematic improvements on the solution while preserving the exploration and exploitation properties of the stochastic search algorithm. The robustness of Genetic Similarity Algorithm (GSA) is assessed on both the PUNQ-S3 and the Brugge field data sets.