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Rate of Penetration Optimization using Differential Evolutionary Extreme Learning Machines

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This paper is an extension of a prior work on the optimization of the rate of penetration (ROP) using Differential Evolutionary Extreme Learning Machines (DEELM). ROP is a major concern in oil drilling industry. The optimization procedure aims eventually to identify drilling parameters resulting in a maximum ROP and minimum drilling cost. In this work we propose the usage of a variant of extreme learning machine (ELM) that parameters are optimized through a differential evolution inner loop. This forms the DEELM. The ROP results are compared with a multiple nonlinear regression model and feed forward neural networks in terms of accuracy and time complexity. The data for drilling parameters will be inputted and rate of penetration (ROP) will be the output. After model building training and optimizing, recommendations about the optimum drilling parameters will be provided to the users.

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