عنوان مقاله:

Soft-Computation with Virtual Intelligence and Genetic Algorithms to Optimize Drilling Bit Selection

محل انتشار:

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خلاصه مقاله:

Drilling industry encounters various challenges during planning and drilling a new well. There are numerous parameters related to drilling operations that are planned and adjusted as drillingadvances. Among them, bit selection is one of the most influential considerations for planning and constructing a new borehole. Conventional bit selections are mostly based on drillers' experiences in the field or mathematical equations, which standmore on recorded performances of similar bits from offset wells. It is evident that these sophisticated interrelations between parameters never can be stated in a single mathematical equation. In such intricate cases, utilizing virtual intelligence and Artificial Neural Networks (ANNs) is proven to be worthwhilein understanding complex relationships between variables. In this paper, two models are developedwith high competence and utilizing ANNs. The first model provides appropriate drilling bit selection based on desired ROP to be obtained by applying specific drilling parameters. The second model uses proper drilling parameters obtained from optimizing procedure to select drilling bit, which provides maximum achievable ROP. Meanwhile, Genetic Algorithm (GA), as a class of optimizing methods for complex functions, is applied. The proposed methodsassess the current conditions of drilling system to optimize the effectiveness of drilling, while reducing the probability of early wear of the drill bit. The correlation coefficients for predicted bit types and optimum drilling parameters in testing the obtainednetworks are 0.95 and 0.90, respectively. The proposed methodology opens new opportunities for real-time and in-field drilling optimization that can be efficiently implemented within the span of the existing drilling practice.

کلمات کلیدی:

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