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Improved Typelog Alignment for Automated Geosteering Using Multi-Stage Penalized Optimization

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Abstract

Automated geosteering relies on logging-while-drilling data from offset wells to make inferences about the geological formation and help guide directional drilling of the subject well. When data from multiple offset wells are available, it is desirable to consistently combine data typelogs from these wells to better estimate the 3D geological formation around the drilling path. We develop a quantitative typelog alignment method based on a Bayesian approach, where the alignment map between pairs of typelogs are modeled as a random function with a prior distribution. A multi-stage penalized procedure is developed that optimizes this alignment map to minimize a misfit function, while taking the prior knowledge into consideration.



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