



## **On exploring heterogeneities from well logs using the empirical mode decomposition**

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In contrast with the traditional analysis approaches, the Empirical Mode Decomposition (EMD) allows to study nonlinear and nonstationary data. Here, this technique is used to perform a scale-based decomposition from Algerian well logs and to investigate heterogeneities of the layers crossed by the wells.

First, the well log data are decomposed into intrinsic mode functions (IMFs). Then, the total depth interval is divided into lithological subintervals. For each subinterval, we compute the mean wavenumber (km) of each mode (m). It is shown that the EMD method behaves as an almost dyadic filter bank, and the heterogeneity of each lithological subinterval can be measured using a scaling parameter value computed as the slope of a linear regression of the plot km vs. m in the log-linear graph. It is worth noting that this parameter can be used to describe underground heterogeneities.

Keywords: empirical mode decomposition (EMD), well logs, multi-scale.