

## **Abstract**

Automated detection of geological boundaries can facilitate the stratigraphic analysis and reservoir characterization. This study applies the wavelet transformation and fractal analysis with pattern recognition technique to detect zone boundaries. In our process two type of features defined for a window on the neighbor of boundary, statistical features and fractal dimension one. Fractal dimension is determined by fractal analysis using wavelet transform. The boundary detection technique was tested using synthetic data and also log data from 8 wells in the one of Iranian fields. The synthetic results show the success of this method on boundary detection. Also we perform our analysis on four type of well log data, gamma ray, resistivity, ROHB and NPHI log. We selected a geological boundary in witness well and the goal was finding the position of that one in other 7 wells. Finally comparison of our results with petrophysical interpretation show that the average difference from true position was 1.3 meter in gamma ray logs and other logs did not converge to proper results. We performed denoising operation with thresholding algorithm in wavelet dimension, on input data. The impact of denoising operation on the features of signal is also studied. Finally we detected zonations of reservoir with discrete wavelet transform and continues wavelet transform

## **Keywords:**

*Reservoir rock characterization, Electrofacies, Continues wavelet transform, Discrete wavelet transform, Denoising, Fractal, Pattern recognition*