

Ever heard of seismic “meme” inversion?

Seismic meme inversion is an inversion method where the word “meme” is used in a geophysical sense, not in the internet/pop-culture sense. It is related to but different from geostatistical inversion. In geostatistical inversion spatial correlation is modelled statistically using variograms. These show distance-based, direction-wise correlations. They are powerful in case the facies are dominantly lateral continuous. That is clearly the weak point of geostatistical inversion and here seismic meme inversion comes into play. This inversion method is based on similarity in seismic waveforms, but note it is based on similarity in waveform implies similarity in geology. The method is particularly strong in handling heterogeneity as it is sensitive to lateral facies changes. However, a good stock of wavelet shapes and related geological character should be available to apply the method with confidence. In that case it is advantageous in geologically complex settings. Years ago I worked with “Pattern Recognition” methods as “Meme Inversion” is just that.

In short: Geostatistical inversion spreads properties based on distance; seismic meme inversion spreads them based on geological similarity (hopefully well) encoded in seismic waveforms.

Best practices is to use them combined