Cluster analysis dengan menggunakan metode EMD (empirical mode decomposition) dan atribut komplek contoh kasus pada daerah boonsville = Cluster analysis using EMD method empirical mode decomposition and complex attributes case in boonsville area

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Abstrak

[ABSTRAK
Cluster analysis dari atribut seismik merupakan suatu metode yang digunakan untuk mengelompokkan litologi dari data seismik yang telah direkam dan diproses. Secara prinsip, cluster analisis memproyeksikan N atribut seismik ke sistem koordinat dengan N-dimensi yang menghasilkan K cluster yang merepresentasikan litologi yang berbeda. Penentuan center dari data dapat dilakukan secara acak yang kemudian berubah-rubah karena proses iterasi (unsupervised).
Dekomposisi spektral mengubah amplitudo seismik sebagai fungsi ruang dan waktu menjadi frekuensi, ruang, dan waktu. Dekomposisi spektral telah digunakan dalam berbagai aplikasi seperti penentuan ketebalan lapisan tipis, visualisasi stratigrafi, dan deteksi hidrokarbon secara langsung. Metode dekomposisi spektral yang biasa digunakan antara lain STFT (short-time fourier transform), CWT (continuous wavelet transform), dan EMD (Empirical Mode Decomposition).
Ada banyak atribut-atribut yang dapat diekstrak dari data seismik dan pemilihan atribut yang hanya dapat mempengaruhi distribusi litologi ini secara dominan bukan merupakan hal yang mudah karena pada kenyataannya beberapa atribut tidak memberikan kontribusi dalam pengelompokkan litologi. Untuk mengurangi hal itu, penulis menggunakan principal component analysis pada atribut seismik. Metode ini memilih atribut yang telah terotasi yang memberikan kontribusi untuk clustering berdasarkan urutan nilai eigen valuenya. Hasil yang didapatkan menunjukkan konsistensi dengan peta litologi yang sudah ada.
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ABSTRACT
Cluster analysis of seismic attributes is a method used to classify the lithology of the seismic data that has been recorded and processed. In principle, cluster analysis of seismic attributes to transform the N system with N-dimensional coordinates that produce K clusters that represent different lithologies. Determination of center of data is done through a random process that later change of due process of iteration (unsupervised).
The spectral decomposition of seismic change amplitude as a function of space and time into the frequency, space and time. Spectral decomposition has been used in various applications such as thickness estimation for thin beds, visualization stratigraphy, reservoir characterization, and direct hydrocarbon detection. There are a variety of spectral decomposition methods, STFT (short-time Fourier transform), CWT (continuous wavelet transform), MPD (matching pursuit decomposition) and EMD (Empirical Mode Decomposition). The method used in this study is the method of EMD
There are many attributes that can be extracted from seismic data and the selection of attributes that can only affect the distribution of the dominant lithology is not an easy thing because of the fact that some attributes do not contribute to the grouping of lithology. To reduce it, the author uses principal component analysis on seismic attributes. This method of selecting the attributes that have been rotated to contribute to clustering

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