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A geophysical method for density reconstruction using wavelet decomposition and watershed segmentation

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A method for density reconstruction of a geophysical object by its gravity field based on composition of wavelet transform and watershed segmentation is presented. The problem is well-known ill-posed and ill-conditioned inverse problem. Many constrained methods giving solution to this problem exist, but suffered from various shortcomings: some of them impose unrealistic restrictions on solution, while others, like continuous wavelet transform, produce continuous density, which is unrealistic [1]. The proposed method overcomes those shortcomings by utilizing composition of continuous wavelet transform and image segmentation method “watershed”[2] to introduce sharp edges, thus making another step towards realistic models.

References

1. Кобрунов А.И. Математические основы теории интерпретации геофизических данных - Ухта: УГТУ, 2007. - 286 с.
2. Cousty, J.; Bertrand, G.; Najman, L.; Couprie, M., “Watershed Cuts: Minimum Spanning Forests and the Drop of Water Principle,” Pattern Analysis and Machine Intelligence, IEEE Transactions on, vol.31, no.8, pp.1362,1374, Aug. 2009

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