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INVERSION OF MAGNETIC ANOMALIES DUE TO 2-D CYLINDRICAL STRUCTURES –BY AN ARTIFICIAL NEURAL NETWORK

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ABSTRACT

Application of Artificial Neural Network Committee Machine (ANNCM) for the inversion of magnetic anomalies caused by a long-2D horizontal circular cylinder is presented. Although, the subsurface targets are of arbitrary shape, they are assumed to be regular geometrical shape for convenience of mathematical analysis. ANNCM inversion extract the parameters of the causative subsurface targets include depth to the centre of the cylinder (Z), the inclination of magnetic vector(Ɵ)and the constant term (A)comprising the radius(R)and the intensity of the magnetic field(I). The method of inversion is demonstrated over a theoretical model with and without random noise in order to study the effect of noise on the technique and then extended to real field data. It is noted that the method under discussion ensures fairly accurate results even in the presence of noise. ANNCM analysis of vertical magnetic anomaly near Karimnagar, Telangana, India, has shown satisfactory results in comparison with other inversion techniques that are in vogue.The statistics of the predicted parameters relative to the measured data, show lower sum error (91%) indicating that good matching and correlation is achieved between the measured and predicted parameters.

KEYWORDS

Magnetic anomaly, Artificial Neural Network, Committee machine, Levenberg – Marquardt algorithm, Hilbert transform, modified Hilbert transform, trial and error method.

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