

Theoretical calculations for borehole geoelectrical measurements near or inside of a spherical body

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Abstract: The paper presents exact formulae numerical modeling of D. C. geoelectric measurements near or inside of a spherical body. The calculations are based on well known spherical function series for the potential due to source electrode buried outside or inside of spherical body. These classical formulae are modified to the form which provides faster convergence namely in cases when the source electrode A is in neighbourhood of the surface of the sphere. There are performed numerical calculations for three electrode measurements AMN in common borehole (case a), as well as for hole-to hole measurements, i.e. source electrode A is kept outside the sphere and voltage dipole MN is shifted along a borehole (case b). It is shown, that the most suitable method of detection of the presence of a spherical body (ore-body, or water filled hole) is the method using case a.

Key words: D. C. potential methods, geoelectric well-logging, spherical functions series

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