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Efficient use of exponential approximation of the kernel function in interpretation of resistivity sounding data

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SUMMARY

This paper describes two different procedures based on the approximation of the Stefanescu kernel function by a linear combination of the small number of exponential functions. The first of them is a procedure for the computation of the resistivity transform from the field observations. Our numerical procedure is an improved Sri Niwas and Israil numerical procedure. The first improvement consists of adding a new linear equation to the system of linear equations for the computation of the coefficients of approximation. The second important improvement is the introduction of the iterative correction of the field resistivity transform if its approximation is not satisfactory.

Using the same expressions, the numerical procedure for computing the apparent resistivity from the layered model parameters has been obtained. The first step of the procedure is the computation of the model resistivity transform using the Pekeris recurrence relation.

Both numerical procedures are simple and very accurate with a short execution time, which is demonstrated by three numerical examples. These procedures are developed to be an efficient numerical base for various interpretation methods of the resistivity sounding data.