

Analysis of Geophysical Potential Fields

A Digital Signal Processing Approach

When some useful information is hidden behind a mass of unwanted information we often resort to information processing used in its broad sense or specifically to signal processing when the useful information is a waveform. In geophysical surveys, in particular in aeromagnetic and gravity surveys, from the measured field it is often difficult to say much about any one specific target unless it is close to the surface and well isolated from the rest. The digital signal processing approach would enable us to bring out the underlying model of the source, that is, the geological structure. Some of the tools of dsp such as digital filtering, spectrum estimation, inversion, etc., have found extensive applications in aeromagnetic and gravity map analysis. There are other emerging applications of dsp in the area of inverse filtering, three dimensional visualization, etc. The purpose of this book is to bring numerous tools of dsp to the geophysical community, in particular, to those who are entering the geophysical profession. Also the practicing geophysicists, involved in the aeromagnetic and gravity data analysis, using the commercially available software packages, will find this book useful in answering their questions on "why and how?". It is hoped that such a background would enable the practising geophysicists to appreciate the prospects and limitations of the dsp in extracting useful information from the potential field maps. The topics covered are: potential field signals and models, digital filtering in two dimensions, spectrum estimation and application, parameter estimation with error bounds.

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