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Super-wide band induction magnetometers - 6x6 and beyond

V. Pronenko, V. Glemba

Lviv Centre of Institute of Space Research, Lviv, Ukraine (pron@isr.lviv.ua/+380-322-639163)

The scientific and prospecting ground geophysics is widely engaged in the experimental study of natural and man-made magnetic fields variations. By this the frequency band of interest of the registered signals may range from 0.1 mHz till 1 MHz, or about 10 orders of magnitude. The amplitude range of magnetic variations in this frequency band also may reach from 1 mkT till 1 fT, so again about 9 orders of magnitude. As theoretical considerations and practical experience show, the best set of parameters to solve the task of measurements of such signals have induction or search-coil magnetometers (IM). Certainly, no possible to create one IM covering all frequency and dynamic bands of the measured signals, what leads to the situation when several IMs, each covering its narrow frequency band, are used in practice. This augments considerably the price of instrumentation and makes not convenient its practical use. But the development of IM operation theory, manufacturing technology and electric components allowed to some advanced companies to create IM with unique parameters: one such IM may be used for measurements of signals covering about 6 orders both by amplitude and frequency band - 6x6 magnetometers. The super-wide band IM design fundamentals are discussed and modern technical solutions of such IM both for lower frequency and higher limits are presented. This study is supported by STCU grant 3165.