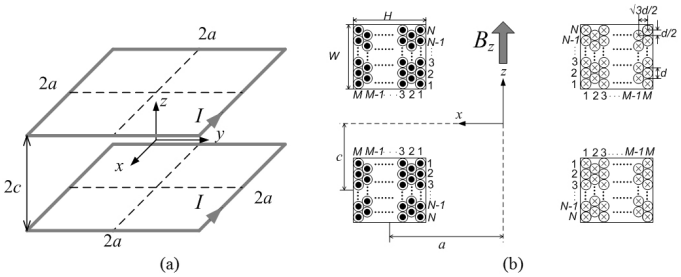
01DC028 Quasi-analytical Design of a Square Helmholtz Coil with Finite Cross-sectional Area as a Magnetic Flux Density Standard

Sakda Somkun[3], **Thepbodin Borirak-Arawin**[3]

This paper describes design of a square Helmholtz coil with finite cross-sectional area to be used as a magnetic flux density standard up to 50 mT at NIMT. Magnetic field inside the square Helmholtz coil was gathered from the magnetic fields produced by every pair of square loops, which was analytically calculated using the Biot-Savart law. The calculated magnetic field was found to be closely agreed with finite element modelling (FEM). Coil resistance was easily predicted with this method, which is very convenient for design under power constraints. The decrease of the coil constant due to thermal expansion was also taken into account.

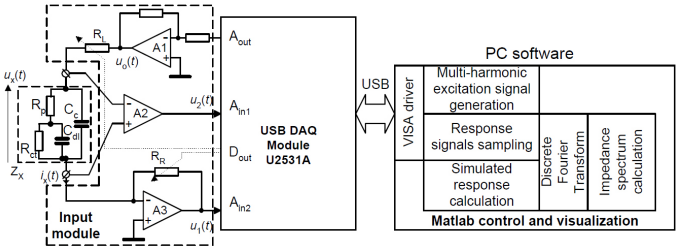


(a) Filamentary square Helmholtz coil
(b) Cross section of a thick square Helmholtz coil

01DC043 Universal Laboratory Measurement System for Evaluation of the Impedance Spectroscopy Method Based on Multi-harmonic Excitation Signal

Jerzy Hoja[4], Michał Kowalewski[4], **Grzegorz Lentka**[4]

The paper presents universal laboratory measurement system for evaluation of the impedance spectroscopy method based on multi-harmonic excitation signal. The system is mainly designed to optimise the method for impedance spectrum digital measurement dedicated to implement in low-cost portable instrument oriented for diagnostics of technical objects located in the field. Due to time constraints during field measurements, it is important to shorten acquisition time of impedance spectrum by using multi-harmonic excitation. Implementation of the method in the field-worthy instrument requires optimisation procedures in terms of hardware complexity and power consumption requirements minimisation.



Simplified block diagram of the proposed laboratory measurement system.