

Parametric electrical modelling of human forearm simulation response using multi-frequency electrical bioimpedance

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This work presents a parametric electrical modelling of the electrical response of human forearm tissues through a simulation of Multi-frequency Electrical Bioimpedance analysis (MF-EBIA). The objective is to estimate the resistance and capacitance values of the three tissue domains in the forearm – the fat, muscle and artery, through parametric analysis. Following up from a simulation analysis of the human forearm model using Ansys® High Frequency Structure Simulator (HFSS), this work assumes an electrical analogy of the human forearm section for every tissue and calculates the electrical parameters. The tissue model was considered to be isotropic with regards to the dielectric properties and the consideration of blood flow was realised by taking three instances of radial artery diameter. The obtained values of resistance and capacitance for every tissue domain provide an insight into their significant contribution to the overall electrical response, which can be important while analysing their individual electrical behaviour and also helpful in various pre-experimental studies related to dielectric characterization of living tissues.

Biography

Gautam Anand is a PhD researcher at Institute of Biomedical Technologies, AUT University. With a background in Electrical and Electronics Engineering, his research interests include biophysics, biosignal acquisition, bioelectronics, bioimpedance analysis and its applications in medical diagnostics.

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