

Bio-impedance tomography

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Bio-impedance tomography is an area of bioengineering with rapid progress in past few years. Electrical and electromagnetic imaging techniques are new and emerging imaging tools with wide range of applications. There is great potential in biomedical applications of electrical and electromagnetic imaging. They provide fast, safe, low cost, non-invasive solution to monitor internal structures and processes where a contrast in passive electromagnetic properties exists and can be measured. In this talk we will present mathematical formulation, computational and experimental challenges for 3D imaging in this area. In particular, nonlinear image and shape reconstruction for 3D imaging will be discussed. The experimental realisation of the volumetric electrical and electromagnetic tomography will be covered. The results will be shown for volumetric imaging for electrical impedance tomography (EIT), electrical capacitance tomography (ECT) and magnetic induction tomography (MIT). Dynamical and 4D image reconstruction methods will be presented. The future directions and challenges in volumetric imaging will be discussed. Further extension includes (but not limited to) multiple-frequency imaging, limited angle imaging, real time imaging, absolute value imaging, and multimodality imaging.

Biography

Manucehr Soleimani is a lecturer in electronic and electrical engineering from University of Bath, UK. He established the Engineering Tomography Laboratory (ETL) in 2011. Dr. Soleimani has published over 180 academic papers including 75 peer-reviewed papers in international journals and 4 patents following his Ph.D. in 2005. He has edited 4 special issues; including a recent issue of Phil. Trans. of the Roy. Soc. A in "New and emerging tomographic imaging". He is a member of the editorial board of a number of international journals including the International Journal of Tomography & Statistics and Biomedical Engineering Online. He is on the organising committee for several key international conferences and chaired the 12th International Conference in Medical EIT in 2011.

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