

Local image reconstruction method for EIT with internal electrodes

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Abstract. This paper propose a local EIT image reconstruction method which aims to enhance image resolution and accuracy in the local interest region when compared with existing EIT reconstruction methods. For the robustness and resolution, we carefully set up the sensitivity matrix with taking account of mutual coherence of its column vectors. With the use of internal electrode near the local region to be imaged, we can increase mutual incoherence of column vectors corresponding to voxels near the internal electrodes. For the local imaging in EIT, we need to eliminate the unrelated quantities from the data in response to the conductivity change in the local region, while maintaining necessary quantity related to the local region. We proposed a local sensitivity matrix which is designed to alleviate the sensitivity of the voxel outside the local region to a projected data whereas optimizing the sensitivity of the voxel inside the local region. The proposed method provides a locally focused matrix F ; multiplying F to the standard linearized system leads to optimized the sensitivity of the voxels in the local region by making the transformed data by F mostly affected by the conductivity perturbation in the specified local region. We perform various numerical simulations to demonstrate the proposed method for the localized EIT imaging. The results show that the proposed method is promising to improve local image resolution.