Efficient Mapping of Objects to FEM Mesh for Bayesian Imaging

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Bayesian imaging using a high-level representation interprets measured data in terms of an unknown number of 'objects', to infer the number and location of 'objects' that make up the system being imaged. When applied to inverse problems where data simulation requires solving a PDE, a significant computational cost can come from the mapping of objects to the FE mesh – assuming that we avoid the cost of remeshing by using a fixed mesh. We show a cheap but provably convergent scheme for that mapping, in the context of locating an unknown number of circular inclusions in electrical impedance tomography (EIT).

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