Inverse Cauchy Problem of Doubly Connected Domains via Spectral Meshless Radial Point Interpolation

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Abstract : In this paper, the spectral meshless radial point interpolation (SMRPI) technique is applied to the Cauchy problems of two-dimensional elliptic PDEs in doubly connected domains. It is obtained the unknown data on the inner boundary of the domain while overspecified boundary data are imposed on the outer boundary of the domain by using the SMRPI. Shape functions, which are constructed through point interpolation method using the radial basis functions, help us to treat problem locally with the aim of high order convergence rate. In this way, localization in SMRPI can reduce the ill-conditioning for Cauchy problem. Furthermore, we improve previous results and it is revealed the SMRPI is more accurate and stable by adding strong perturbations.