Pseudo-spectral least-squares method for elliptic interface problems

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ABSTRACT
This paper develops least-squares pseudo-spectral collocation methods for elliptic boundary value problems having interface conditions given by discontinuous coefficients and singular source term. From the discontinuities of coefficients and singular source term, we derive the interface conditions and then we impose such interface conditions to solution spaces. We define two types of discrete least-squares functionals suming discontinuous spectral norms of the residual equations over two sub-domains. In this paper, we show that the homogeneous least-squares functionals are equivalent to appropriate product norms and the proposed methods have the spectral convergence. Finally, we present some numerical results to provide evidences for analysis and spectral convergence of the proposed methods.

REFERENCES