Localized axial Green's function methods

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ABSTRACT

The axial Green's function method(AGM) and its localized version that we call the localized AGM or briefly LAGM have been developed so far to solve general elliptic boundary value problems[1], the Stokes flows[2], and the convection-diffusion equation with the convection dominated[3]. We pay attention to the potential of the LAGM, which in fact could be a very general numerical method for calculating accurately the numerical solution in any arbitrary domain without any burden caused by preprocess like mesh or grid.

Here, we are going to open the potential of the LAGM by showing results that it can be applied to the general problems based on the incompressible Navier-Stokes flows. The numerical solvability of high Reynolds number flows is of interest. The convection-dominated problem that we have considered is actually the prerequisite for this. If needed for raising accuracy, an adaptive refinement would be introduced, too. Briefly speaking, the LAGM including AGM is a method to solve the numerical solution of partial differential equations in high dimensional spaces using one-dimensional Green's function along each axis, which is called the axial Green's function.

REFERENCES

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