

عنوان مقاله:

Random Vortex Method for Geometries with Unsolvble Schwarz-Christoffel Formula

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 31، شماره 1 (سال: 1396)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

In this research we have implemented the Random Vortex Method to calculate velocity fields of fluids inside open cavities in both turbulent and laminar flows. the Random Vortex Method is a CFD method(in both turbulent and laminar fields) which needs the Schwarz-Christoffel transformation formula to map the physical geometry into the upper half plane. In some complex geometries like the flow inside cavity, the Schwarz-Christoffel mapping which transfers the cavity into the upper half plane cannot be achieved easily. In this paper, the mentioned mapping function for a square cavity is obtained numerically. Then, the instantaneous and the average velocity fields are calculated inside the cavity using the RVM. Reynolds numbers for laminar and turbulent flows are 50 and 50000, respectively. In both cases, the velocity distribution of the model is compared with the FLUENT results that the results are very satisfactory. Also, for aspect ratio the cavity (α) equal 2, the same calculation was done for $Re=50$ and 50000. The advantage of this modelling is that for calculation of velocity at any point of the geometry, there is no need to use meshing in all of the flow field and the velocity in a special point can be obtained directly and with no need to the other points.

کلمات کلیدی:

Flow Field, Numerical Simulation, Open Cavity, Random Vortex Method, Turbulent

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