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A under-resolved scheme for certain partial differential equations with boundary layer phenomena

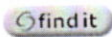
Cheng, Wenfang. Indiana University, ProQuest Dissertations Publishing, 1999. 9962700.

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Abstract/Details

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Abstract [Translate](#)


The purpose of this thesis is to propose and study an under-resolved scheme for a classical boundary layer problem, [Special characters omitted.] its steady state problem and its two dimensional generalization, where [Special characters omitted.] is a fixed constant. This problem is a special case of the incompressible Navier-Stokes equations and usually associated with boundary layer phenomena for small values of [Special characters omitted.] . Our idea of under-resolved scheme is to incorporate into the finite element base a boundary layer type function associated with the problem. In this way the small scale is built into the base and hence we are able to derive qualitatively and quantitatively correct approximate solution to the problem in the under-resolved case ([Special characters omitted.] , where  $h$  is the mesh size). The systematic asymptotic expansion is possible for this model boundary layer type problem which generalizes previous results.

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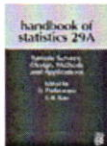
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