

On the solution of second order singular perturbation problems by generalized upwind methods

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Abstract

The solution of second order singular perturbation BVPs is one of the most challenging ODE problems [4]. Several codes for BVPs have been specialized in order to solve the most difficult problems (see, for example, COLMOD and ACDC written by Cash and Wright [5, 6]).

In a recent paper [1] we proposed a simple and quite efficient code to solve linear singular perturbation problems when the perturbation parameter is very small. The code is based on generalized upwind methods of order ranging from 4 to 10 and uses highly variable stepsize to fit the boundary regions with relatively few points. We now analyze the solution of nonlinear problems by means of a simple quasi-linearization technique that allows to compute a variable mesh maintaining the same peculiarity of the linear code.

References

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