Resolvent estimates in $L^p$ for discretisations of second order elliptic ordinary differential operators on variable grids

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Dedicated to Ian Sloan on the occasion of his 65th birthday

Abstract

In this paper a resolvent estimate is proved for discretisations of second order ordinary differential operators subject to Dirichlet boundary conditions on a finite or infinite interval. As discretisation method a fully discrete Galerkin method using continuous splines of order $r \geq 2$ on a locally quasi-uniform grid is considered. As a byproduct an a priori estimate for the discretised differential operator is obtained.