Jan Brandts, Sergey Korotov, Michal Křížek: *The discrete maximum principle for linear simplicial finite element approximations of a reaction-diffusion problem* ; Helsinki University of Technology, Institute of Mathematics, Research Reports A525 (2007).

Abstract: *This paper provides a sufficient condition for the discrete maximum principle for a fully discrete linear simplicial finite element discretization of a reaction-diffusion problem to hold. It explicitly bounds the dihedral angles and heights of simplices in the finite element partition in terms of the magnitude of the reaction coefficient and the spatial dimension. As a result, it can be computed how small the acute simplices should be for the discrete maximum principle to be valid. Numerical experiments suggests that the bound, which considerably improves a similar bound in* [6]*, is in fact sharp.*

AMS subject classifications: 65N30, 65N50

Keywords: reaction-diffusion problem, maximum principle, finite element method, discrete maximum principle, simplicial partition, angle condition

Correspondence

brandts@science.uva.nl, sergey.korotov@hut.fi, krizek@math.cas.cz

ISBN - 978-951-22-8781-9
ISSN 0784-3143

Helsinki University of Technology
Department of Engineering Physics and Mathematics
Institute of Mathematics
P.O. Box 1100, FI-02015 TKK, Finland
email:math@tkk.fi http://math.tkk.fi/