TEHNIČKI FAKULTET
Sveučilište u Rijeci

UNIVERSITY OF RIJEKA
Faculty of Engineering

Gostujuće predavanje
12:00-13:00, 04 veljače 2010
Soba za sastanke Tehničkog fakulteta (0-12)

ZAVODA ZA RAČUNARSTVO
I
ZAVODA ZA MEHANIKU FLUIDA I RAČUNARSKO INŽENJERSTVO

Doc. Luka Grubišić, dr. sc.

Zavod za numeričku matematiku i računarstvo
PMF Matematički odjel
Svučilište u Zagrebu

A robust hierarchical eigenvalue/eigenvector enhancement

(joint work with Randolph Bank and Jeffrey S. Ovall)

We prove the reliability and efficiency of a variant hierarchical basis eigenvalue/eigenvector approximation's estimator for a general symmetric and elliptic operator.
The reliability estimates hold without any further assumptions save the well posedness of the associated variational boundary value problem(s).
The new estimator extends to general symmetric divergence type operators our earlier result on hierarchical error estimators from [1].
Further, we present a framework for incorporating the information contained in the hierarchical error estimator to enhance the convergence properties of the eigenvalue approximation. Also, a robust method for enhancing eigenvector approximations is presented. Let us restate that our theory of the convergence enhancement for both eigenvalues and eigenvectors is presented under the sole assumption that associated boundary value problem is well-posed. This is our definition of robust.
Numerical experiments will be presented.

[1] L. Grubisic and J. S. Ovall. On estimators for eigenvalue/eigenvector approximations.
Mathematics of Computation, 78(266):739–770, 2009.