

Oscillation in a posteriori error estimation

Christian Kreuzer[†] and Andreas Veerer^{*}

[†] Fakultät für Mathematik
Technische Universität Dortmund
Vogelpothsweg 87, 44227 Dortmund, Germany
e-mail: christian.kreuzer@tu-dortmund.de, web page:
<http://www.mathematik.tu-dortmund.de/lxx/cms/de/mitarbeiter/ckreuzer.html>

^{*} Dipartimento di Matematica
Università degli Studi di Milano
Via C. Saldini 50, 20133 Milano, Italy
e-mail: andreas.veerer@unimi.it - web page: <http://sites.unimi.it/aveerer/>

ABSTRACT

In a posteriori error analysis, the relationship between error and estimator is usually spoiled by so-called oscillation terms, which cannot be bounded by the error. In order to remedy, we devise a new approach where the oscillation has the following two properties. First, it is dominated by the error, irrespective of mesh fineness and the regularity of data and the exact solution. Second, it captures in terms of data the part of the residual that, in general, cannot be quantified with finite information. The new twist in our approach is a locally stable projection onto discretized residuals. In the case of the Poisson problem, the approach leads to an improved standard residual estimator and allows tackling problems with sources in H^{-1} .