

# Preconditioning of Elliptic Boundary Value Problems

Olaf Steinbach<sup>1</sup>

The discretization of second order elliptic boundary value problems by either finite or boundary element methods leads to large linear systems of algebraic equations. Since the spectral condition number of the stiffness matrix depends in general on the discretization parameter  $h$ , preconditioning seems to be mandatory.

Here we present a general concept of preconditioning which is based on the use of operators of the opposite order. This involves different approaches, e.g. the use of different boundary integral operators, the use of appropriate multilevel operators, and the use of certain Newton potentials in finite element methods.

The numerical analysis is based on an approximate discretization of inverse operators by using a mixed scheme. Hence, a suitable stability condition is required.

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<sup>1</sup>Technische Universität Graz, Institut für Numerische Mathematik, Steyrergasse 30, 8010 Graz, Austria,  
o.steinbach@tugraz.at