Solution of linear systems for boundary value problems in high spatial dimensions

Wolfgang Hackbusch

Max-Planck-Institut,
Mathematik in den Naturwissenschaften,
Leipzig,
Germany
wh@mis.mpg.de

Consider an elliptic boundary value problem in the domain D1 x D2 x ... x Dd, where the spatial dimension d may be much larger than 3. In such a case, standard methods lead to linear systems of a size too huge for any computer. Because of the Cartesian product domain, tensor methods can be applied. We show how iterative methods with a good preconditioner can be constructed. Even multigrid ideas can be applied.