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The coercitivity of elliptic sesquilinear forms on the Sobolev spaces $[W^{k,s}_2(\Omega)]^M$ [Abstract of thesis]

Commentationes Mathematicae Universitatis Caroliniae, Vol. 29 (1988), No. 1, 197

Persistent URL: http://dml.cz/dmlcz/106611

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ABSTRACTS OF CSc. (Candidatus Scientiarum) THESES IN MATHEMATICS defended recently at Charles University, Prague

THE COERCIVITY OF ELLIPTIC SESQUILINEAR FORMS ON THE SOBOLEV SPACES $W_2^{(s)}(\Omega)^M$

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In the presented work, the coercivity of elliptic bilinear forms is investigated on Sobolev spaces $W_2^{(k-\Theta)}(\Omega)^M$ and $W_2^{(k+\Theta)}(\Omega)^M$ ($|\Theta| < \frac{1}{2}$), which correspond to the system of linear partial differential equations of the second order.

The bilinear form is uniformly elliptic and the coefficients fulfil some conditions of smoothness. $\Omega$ is a domain with Lipschitzian boundary. Under these assumptions it was shown, based upon the Lax-Milgram lemma, that the solution to the Dirichlet boundary value problem exists and is unique.


GENERALIZED L-SPLINES AND THE MULTI-POINT BOUNDARY VALUE PROBLEM

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In the dissertation, the problem of existence and convergence of splines is investigated. There are defined $L_A^-$splines which are a generalization of

L-splines with mixed boundary conditions. The word mixed means a linear combination of the values of the function and its derivatives at various points.

As a tool of investigation of the spline interpolation, the theory of N-point splines is used. The problem has been defined in such a way that the results may be used for the broadest classes of splines.

The realization method is as follows:
- and analysis of N-point problem by transforming it to a two-point boundary value problem for a system of linear differential equations;
- an exact answer was given to the question when the N-point problem is self-adjoint;
- simply verifiable conditions ensuring the existence and uniqueness of the solution, i.e. $L_A^-$splines, were found.

The results are applied to some technical examples.

We have shown that classical splines of an odd degree and L-splines are special cases of $L_A^-$splines defined in this work.

The results may also be applied to other multi-point boundary value problems.

ON A CLASS OF TORSION-FREE ABELIAN GROUPS

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The class of all purely finitely generated torsionfree Abelian groups was intensively studied in the last ten years (Butler groups). In the paper