Technische Universität Braunschweig

Vortrag im Gästeprogramm des GRK 2075

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Similarity of structures based on matrix similarity

Dienstag, 13.09.2016, 15.00 Uhr
Institut für Wissenschaftliches Rechnen, Raum 812
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Presented is a numerical procedure for relating the behaviour of two different structures, i.e. for determination of a scale between the two structures. This novel solution is based on the notion of matrix similarity and linear transformations, with the restriction that the scale between structures is determined only after structural discretization and that both structures have to be in the elastic regime.
The structure scale can be determined in the loading space or the displacement space (i.e. structure forces or displacements are put into relation) where scaling of the static structure model is based on the matrix equivalence principle and scaling of the dynamic structure model is based on the Smith normal form. The structure scale in the operator space (structure stiffness or flexibility matrices are put into relation) should be based on the Sylvester matrix equation. However, that approach is not practical and is replaced with the Levenberg-Marquardt method for obtaining only approximately equivalent stiffness matrices.
Numerical examples illustrate the proposed novel approach.

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