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Ludwig Kohaupt* (kohaupt@bht-berlin.de), Beuth University of Technology, Department of Mathematics, Luxemburger Str. 10, 13353 Berlin, Germany. *Contributions to optimal bounds on the solution of vibration problems.*

In this talk, we give an overview on the results of the author's recent *Cumulative Habilitation Thesis* and add an outlook on future developments.

In the Habilitation Thesis, we describe the development of a differential calculus for norms of matrix and vector functions, the derivation of new bounds for the initial and terminal domains on the solution of ordinary differential equations representing dynamical systems with vibration behavior and the application of the results to the determination of optimal constants in the bounds. The new results go far beyond what has been known so far. Especially, with respect to two-sided bounds, multi-mass vibration systems can now be handled almost as good as one-mass systems. The new optimal bounds mean a significant theoretical and practical progress in the theory of vibration and cannot be obtained by the methods employed so far. Some of the new results are of general interest. (Received January 08, 2010)