

Interval Dependency and the Problem of Solving Parametric Linear Systems

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One of the key points in interval computations is a suitable inclusion function which allows to solve the problem efficiently. Evaluation using the simplest form of interval analysis (natural extension) produces a wide interval. This is due in a large part to the fact that interval arithmetic is only sub-distributive. Another problem, commonly referred to as interval dependency, is that the multiple occurrences of a variable are considered as different variables during interval evaluation. In this study, the problem of solving parametric linear systems with coefficients dependent on interval parameters is considered. Different approaches to dealing with the interval dependency problem, suggested in the literature, are compared and used to obtain an efficient method for solving parametric linear systems. Numerical examples of structural mechanics are provided to verify and compare the performance of the proposed approaches.