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Interval-affine Gaussian method for systems with constrained coefficients

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Abstract. In paper outer problem for interval linear algebraic systems with constrained coefficients is considered. For the case of linear constraints it is shown that the interval-affine Gaussian method can be successfully applied. The results of computation experiments using this method are given.

By the systems with constrained coefficients we mean such linear algebraic systems when there are some constraints for elements of real matrices from main interval matrix. In paper we consider case of linear constraints mainly. For example, elements of symmetric and skew-symmetric matrices are linearly constrained.

Interval-affine Gaussian method was constructed as alternative for well-known interval Gaussian method. It based on using interval-affine arithmetic and it gives a chance to noticeably improve the quality of outer enclosures of joined solution set. This improvement is consequence of interval-affine arithmetic ability to take into account dependence between arguments in arithmetical operations. It is shown this property let us easily adapt interval-affine Gaussian method for solving problem with constrained coefficients. In linear case the method takes constraints into account entirely and actually reduces problem to problem with less number of interval parameters.

The results of computation experiments using this method are given. The experiments show that taking constraints into account let us sharpen the outer enclosures of joined solution set.

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