

VERIFIED COMPUTING IN LINEAR ALGEBRA: SOLVING A LINEAR SYSTEM

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Solving numerically a linear system can be performed very efficiently, using optimized routines, but it yields an approximate solution without any indication about its accuracy. Getting an enclosure of the error between the approximate solution and the exact solution is called "verification". We present a verified algorithm [2] that computes an accurate, i.e. tight, enclosure of the error and that exhibits good performances, both in terms of theoretical complexity (operations count) and of practical execution time of the implementation. It is based on iterative refinement [1] for accuracy, on interval arithmetic [4] for verification, with well-chosen computing precision at strategic points of the computation.

References

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