ABSTRACT:

We propose a general framework to analyze numerical stability of recursive matrix multiplication algorithms. As a consequence of our analysis, we show that the exponent of matrix multiplication can be achieved by numerically stable algorithms. We also show that new group-theoretic algorithms proposed by H. Cohn, R. Kleinberg, B. Szegedy and C. Umans are numerically stable. We perform detailed error analysis for several specific fast group-theoretic algorithms.

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