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zhao chen* (zchen@NYCTC.CUNY.EDU), 300 Jay Street, Brooklyn, NY, NY 11202. *Improved Algorithms of Recursive Triangular Factorization for Cauchy-like Matrices.*

Considering the computations for the solution $\tilde{x} = C^{-1}\tilde{a}$ for a generalized Cauchy-like linear system equation $C^{-1}\tilde{x} = \tilde{a}$, we dramatically improve the known algorithms by devising a new technique for transformation among the Cauchy-like matrices. The transformation reduces generalized Cauchy-like linear systems equations to applications of Fast Fourier Transforms and to solving Cauchy-like linear systems equations in the special case where the solution by Pan and Zheng's algorithms is extremely efficient. The efficient algorithms of Recursive Triangular Factorization [PZ2000] are extended to the solution of generalized Cauchy-like linear systems of equations. As a result, our algorithms solve linear systems equations with an $n \times n$ generalized Cauchy-like coefficient matrix at the cost of $O(nr^2 \log^2 n)$ arithmetic operations, versus the known bound of order $O(nr^2 \log^3 n)$. Our improvement is by a factor of $\log n$ due to the transition of a generalized Cauchy-like matrix to the special Cauchy-like matrix with the basic vectors being unit roots. Consequently, the determinant of an $n \times n$ generalized Cauchy-like matrix C can be computed at the same cost bound. (Received September 18, 2000)