Reduction of Huge, Sparse Matrices over Finite Fields Via Created Catastrophes

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Abstract

We present a heuristic method for the reduction modulo 2 of a large, sparse bit matrix to a smaller, dense bit matrix that can then be solved by conventional means, such as Gaussian elimination. This method worked effectively for us in reducing matrices as large as 100,000 $\times$ 100,000 to much smaller, but denser square matrices.