Matrix Multiplication and PDE via Wavelets

Proposal:

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http://dione.cs.ttu.edu/wavelet/wavelets.pdf

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Abstract:

One overwhelming question drives computational science; how fast can the answer be computed. In this thesis, the questions are for two computational areas of mathematics. One is how fast can matrix multiplication be computed. Second is how quickly can a partial differential equation be solved. Of course there are already conventional algorithms to compute them.

The wavelet operator provides a conditioning feature to matrices used in matrix multiplication and PDE. Such conditioning produces two effects which are desirable in both operations, sparseness and unity condition number. This thesis contributes a simple analysis of the wavelet operator as it applies to these numerical operations.