

Meeting: 1003, Atlanta, Georgia, MAA CP X1, MAA General Contributed Paper Session, I

1003-X1-1179 **Yi Wang***, Department of Mathematics, Fairmont State University, Fairmont, WV 26554. *Fast wavelet collocation methods for second kind integral equations using parallel computing.* Preliminary report.

In this talk, we develop algorithms to implement the parallel computing of fast wavelet collocation methods for second kind integral equations over polygons. We will briefly review the fast wavelet collocation methods for second kind integral equations over polygons, which were developed in the author's Ph.D. dissertation. By using the wavelet method, the computation complexity for generating the coefficient matrix of the discretized system is dramatically reduced from $O(N^2)$ to $O(N \log N)$, where N is the dimension of the approximating space. Nevertheless, to get more accurate solutions in higher dimensions of approximation spaces on a stand alone machine, there are two difficulties: 1) the lengthy time due to generating the coefficient matrix; 2) limitation on the dimension of the approximation space due to the limited memory. Using parallel computing not only can achieve much less computing time, but also can resolve the memory limitation problem on a stand alone machine. Namely, by using the distributed memory, one can deal with much higher dimensions of approximating space, hence can obtain more accurate solutions. Numerical results will be presented to demonstrate the proposed algorithm. (Received October 04, 2004)