

Randomized approximation and solution of elliptic PDEs

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In this talk we survey previous and present recent results on the approximation of smooth functions by randomized algorithms. We consider functions from a Sobolev space $W_p^r(Q)$, with the error of approximation measured in the norm of another Sobolev space $W_q^s(Q)$. The case $q = 2$ and $s < 0$ has close relations to elliptic partial differential equations in weak form. We also discuss approximation in several norms simultaneously, which turns out to be useful for applications to the finite element solution of elliptic PDEs.