THE UNIVERSITY OF CHICAGO | **THE COMMITTEE ON COMPUTATIONAL AND APPLIED MATHEMATICS**

COLLOQUIUM

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A discrete potential theory on weighted graphs

THURSDAY, March 5th at 4:00 PM

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ABSTRACT

We present a discrete potential theory on weighted graphs. Our goal is to define operators analogous to the continuum potential theory relying only on knowledge of the graph Laplacian and a partition of the nodes into interior, exterior and boundary. Our definition of single and double layer operators allows to bring classic results from potential theory to weighted graphs. In particular we show that single, double layer potential and hypersingular operators obey classic continuum identities related to the Calderón and the Dirichlet-to-Neumann maps. We also give a discrete analogous to a classic result on the spectrum of the Neumann-Poincaré operator.