1067-05-1733 **Palle E. T. Jorgensen** and **Erin P. J. Pearse*** (ep@ou.edu), Dept of Mathematics, 810 Physical Sciences Center, Norman, OK 73019-0315. *Resistance analysis of infinite networks.*

I will discuss effective resistance as a tool for the analysis of infinite networks (connected weighted graphs). I will also describe how effective resistance can be used in conjunction with a discrete version of the Gauss-Green formula to study the Hilbert space $\mathcal{H}_\mathcal{E}$ of functions of finite energy on a network, and how this leads to a boundary representation for the harmonic functions of finite energy.

The boundary here is not part of the original network; it must be constructed in a manner analogous to Martin boundary (in the theory of Markov processes). However, instead of extending the space directly (via metric completion) as in the case of Martin boundary, the *resistance boundary* is obtained by first embedding the network into the space of finite-energy functions $\mathcal{H}_\mathcal{E}$, and then extending this function space. This essentially corresponds to the construction of a suitable class of distributions, defined with respect to a certain space of "test functions" of finite energy. As a result, the boundary of the original network can be studied in terms of certain linear functionals on $\mathcal{H}_\mathcal{E}$. (Received September 21, 2010)