Meeting: 1000, Albuquerque, New Mexico, SS 7A, Special Session on Spectral Geometry

1000-35-49 **Stephen A. Fulling*** (fulling@math.tamu.edu), Mathematics Department, Texas A&M University, College Station, TX 77843-3368. *The Robin Boundary Condition: A Technique and Spectral Consequences.*

A simple transformation converts a solution of a partial differential equation with a Dirichlet boundary condition to a function satisfying a Robin (generalized Neumann) condition. In the simplest cases this observation enables the exact construction of the Green functions for the wave, heat, and Schrödinger problems with a Robin boundary condition. The resulting physical picture is that the field can exchange energy with the boundary, and a delayed reflection from the boundary results. In more general situations the method allows at least approximate and local construction of the appropriate reflected solutions, and hence a "classical path" analysis of the Green functions and the associated spectral information. By this method we solve the wave equation on an interval with one Robin and one Dirichlet endpoint, and thence derive several variants of a trace formula for the density of eigenvalues. The variants are consistent except for an interesting subtlety of distributional convergence that affects only the neighborhood of zero in the frequency variable. The trace formula is exact and includes contributions of orbits bouncing back from the boundaries as well as periodic orbits. This work was done in collaboration with Joel Bondurant. (Received August 06, 2004)