1020-42-166   **John L Fleming*** (`flemingj@duq.edu`), Duquesne University, Dept. Of Math. and Comp. Sci, Pittsburgh, PA 15282. *Analysis of the Convergence of Fourier Coefficients Using a Variational Approach.* Preliminary report.

We consider a Fourier based solution to Laplace's equation. Due to the particular geometry of the problem the Fourier coefficients will be given by the solution of an infinite linear system of equations. The talk will provide a description of the geometry, the Fourier series solution of the differential equation and a variational formulation of the problem. In practice, computation of the Fourier coefficients is performed by truncating to yield a finite system of equations. We will prove that a solution exists for the finite system and that the solution converges to the true solution of the infinite system as the the size of the finite system increases. The proof involves comparing the variational formulation of the problem to the Fourier approach. The variational formulation will also allow some conclusions regarding the rate of convergence of the finite problem. (Received August 26, 2006)