

1096-35-72

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*Boundary Value Problems on a Half Sierpinski Gasket.*

We study boundary value problems for the Laplacian on a domain  $\Omega$  consisting of the left half of the Sierpinski Gasket ( $SG$ ), whose boundary is essentially a countable set of points  $X$ . For harmonic functions we give an explicit Poisson integral formula to recover the function from its boundary values, and characterize those that correspond to functions of finite energy. We give an explicit Dirichlet to Neumann map and show that it is invertible. We give an explicit description of the Dirichlet to Neumann spectra of the Laplacian with an exact count of the dimensions of eigenspaces. We compute the exact trace spaces on  $X$  of the  $L^2$  and  $L^\infty$  domains of the Laplacian on  $SG$ . In terms of these trace spaces, we characterize the functions in the  $L^2$  and  $L^\infty$  domains of the Laplacian on  $\Omega$  that extend to the corresponding domains on  $SG$ , and give an explicit linear extension operator in terms of piecewise biharmonic functions. (Received July 09, 2013)