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As part of an effort to develop more accurate and efficient numerical methods for solving PDE with piecewise constant coefficients, we will describe an approach to computing a basis of eigenfunctions. These eigenfunctions will have the form of trigonometric functions that change frequency at discontinuities; therefore, amplitude, frequency, and phase shift are the only parameters that need to be determined. Properties such as continuity, periodicity, and orthogonality can be used to eliminate some of these parameters. To find the remaining parameters, iteration will be used. Fefferman's *SAK* principle, based on the Uncertainty Principle, provides excellent initial guesses for iteration. Numerical results will demonstrate the effectiveness of this approach. (Received September 16, 2014)