

AN ELEMENT BASED SPECTRAL COLLOCATION TECHNIQUE

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In many applications, it is ideal to have high order approximations of the solution. For example, problems involving high oscillatory solutions. A high order approximation is able to efficiently capture the solution. This talk presents a high order discretization technique based on spectral collocation on each of the elements. Continuity of the solution and the flux on the interfaces between the elements is done strongly and in a high order manner. This discretization technique is called the Hierarchical Poincaré-Steklov (HPS) method. Numerical results will illustrate the potential of the method including its ability to accurately handle mid-to-high frequency Helmholtz problems. Efficient direct and iterative solution techniques for the sparse linear system that results from the HPS discretization will also be presented.