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A HALF-SPACE ANALYSIS FRAMEWORK FOR BOUNDARY CONTROL PROBLEMS

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Optimization problems are locally characterized by the spectrum of the Hessian. By default, this spectrum is not a priori known and very expensive to compute. A classical Fourier analysis yields a sufficient approximation of the spectrum, if boundary conditions are not crucial. This makes this type of analysis useless for boundary control problems, i.e. a class of optimization problems where right-hand sides of the boundary conditions needs to be found in order to minimize an objective. In this talk we present a mode analysis based on a half-space domain where the effect of only one boundary condition at a time can be included. The resulting half-space analysis is complementary to the classical Fourier analysis. Both a discrete and continuous version of the analysis exists, yielding invaluable information for designing textbook efficient multigrid methods. We present a complete framework as well as it's application to parabolic boundary control problems.