DOWNLOAD PDF NUMERICAL METHODS IN SENSITIVITY ANALYSIS AND SHAPE OPTIMIZATION

Chapter 1 : Numerical Optimization - PDF Free Download

Numerical Methods in Sensitivity Analysis and Shape Optimization will be of interest to graduate students involved in mathematical modeling and simulation, as well as engineers and researchers in applied mathematics looking for an up-to-date introduction to optimization techniques, sensitivity analysis, and optimal design. The work is suitable as a textbook for graduate courses in any of the topics mentioned above, and as a reference text.

Show Context Citation Context Gradientbased boundary shape optimization, which is what we consider here, typically relies on a calculus of variation with respect to a set of parameters that governs displacements of the boundary Chu, Chun-hung Kuo, Matthew, M. Modern economic theory views the economy as a dynamical system in which rational decisions are made in the face of uncertainties. The dynamics includes changes over time of market behavior such as consumption, investment, labor supply, and technology innovation, all interpreted in a broad The dynamics includes changes over time of market behavior such as consumption, investment, labor supply, and technology innovation, all interpreted in a broad sense. The Euler equation arises as the first order optimality condition when solving an economic dynamics system. Finding the policy function inherent in the Euler equation is an important but challenging task. This note proposes a Newton iterative scheme on approximating the unknown policy functions by composite 1-dimensional cubic splines. This spline approach has the advantages of freedom in the node collocation, simplicity in the derivative calculation, fast convergence, and high precision over the conventional projection methods. Applications to the neoclassical growth model with leisure choice are used to demonstrate the working of the idea. In particular, tensor products are employed to simplified and effectuate the operations. Taking advantage of the vector operations in Matlab, a Duffy , " Duffy, who passed away in September of Having never graduated from high school himself, and having worked in the bleak Pennsylvania steel industry throughout my early life, he always pushed for and encouraged my continuin Having never graduated from high school himself, and having worked in the bleak Pennsylvania steel industry throughout my early life, he always pushed for and encouraged my continuing education so that I might have a better life than his. I would like to thank my other committee members for their help in completing this dissertation and for the valuable insight each has provided in the various topics that have comprised my graduate research. I would like to thank the Florida State University Mathematics Department for supporting me as a teaching assistant in my first few years as a graduate student. I would like to acknowledge the sources of my research assistantship funding, the National Science Foundation Show Context Citation Context One should take note that in most methods, a vast majority of the Jk i matrices will be 0. Indeed, as previously stated it is dependent upon the time discretization. In general, an nt This investigation was funded by Schlieder Urban Environmental Systems and by Jefferson Parish that provided full economical support for both my academic preparation at the University of New Orleans and the experimental development of this research project. I wish to express my deepest appreciation I wish to express my deepest appreciation and sincere gratitude to Dr. La Motta, who was my advisor and major professor at UNO, for his guidance, help, and unconditional support through my graduate studies, and especially for his contribution and direction to this research project. Additional thanks to Dr. Kura for acting as members of my thesis committee. I want to thank God, for all the opportunities he put in my life and for his guidance every time that I feel lost. I wish to thank my parents Ivonne and Luis for their unconditional love, encouragement, and support, and especially for teaching me the value of perseverance and hard work throughout my life. I also wish to thank my siblings for their love and understanding.

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Chapter 2 : Shape optimization - Wikipedia

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Find the shape of an airplane wing which minimizes drag. Here the constraints could be the wing strength, or the wing dimensions. Given a known three-dimensional object with a fixed radiation source inside, deduce the shape and size of the source based on measurements done on part of the boundary of the object. A formulation of this inverse problem using least-squares fit leads to a shape optimization problem. Techniques[edit] Shape optimization problems are usually solved numerically , by using iterative methods. That is, one starts with an initial guess for a shape, and then gradually evolves it, until it morphs into the optimal shape. Keeping track of the shape[edit] Example: Shape optimization as applied to building geometry. Example provided courtesy of Formsolver. Optimization shape families resulting from differing goal parameters. Several approaches are usually used. One approach is to follow the boundary of the shape. For that, one can sample the shape boundary in a relatively dense and uniform manner, that is, to consider enough points to get a sufficiently accurate outline of the shape. Then, one can evolve the shape by gradually moving the boundary points. This is called the Lagrangian approach. Another approach is to consider a function defined on a rectangular box around the shape, which is positive inside of the shape, zero on the boundary of the shape, and negative outside of the shape. One can then evolve this function instead of the shape itself. One can consider a rectangular grid on the box and sample the function at the grid points. As the shape evolves, the grid points do not change; only the function values at the grid points change. This approach, of using a fixed grid, is called the Eulerian approach. The idea of using a function to represent the shape is at the basis of the level set method. A third approach is to think of the shape evolution as of a flow problem. That is, one can imagine that the shape is made of a plastic material gradually deforming such that any point inside or on the boundary of the shape can be always traced back to a point of the original shape in a one-to-one fashion.