DIRECT METHOD FOR SOLVING VARIATIONAL PROBLEMS USING HAAR WAVELET

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Abstract

Analytical solution of different optimal control problems are difficult to obtain because they involve differential equations with single or multiple boundary conditions. In these dissertations, numerical methods using Haar Wavelet are presented to overcome this difficulty. The method reduces the differential equation into a set of linear matrix algebraic equation.The fundamental idea of a Direct Method for solving variational problems is to convert the problem of extremization of a function into one which involves a finite number of variables. The nice properties of Haar Wavelet like compact support in time and multi resolution are shown to reduce the computational complexity to a great extent. The presented method is applied to achieve the optimal control for time varying and time invariant performance indices.