

HAAR WAVELET BASED COMPUTATIONALLY EFFICIENT OPTIMIZATION OF LINEAR TIME VARYING SYSTEMS

ABHINAV JAIN & MONIKA MITTAL

Department of Electrical Engineering, National Institute of Technology, Kurukshetra, Haryana, India

ABSTRACT

Optimization using existing methods is computationally costlier task for complex control systems such as a high order system with time varying parameters. Various authors' solved optimization problems using different types of signal transforms followed recently using Haar wavelet transform which proved to be an excellent mathematical tool in signal processing. In this domain, the pioneering work has been done by Chen and Hsiao using computationally inefficient recursive Haar operational matrices. In this paper optimization of linear time variant systems has been done using computationally efficient non-recursive Haar backward integral operational matrix. The computational time savings, with respect to increase in resolution, obtained in the proposed method vis-à-vis Hsiao method are computed using MATLAB 7.6.0.324 (R2008a) thereby establishing computational efficiency of the proposed method.

KEYWORDS: Haar Wavelets, LQR, Optimal Control, Time-Varying Systems