Frequency Fragmented Least Squares Support Vector Machines

Ricardo Castro, Koen Tiels, and Johan A. K. Suykens

***Abstract*—In this paper, two new methodologies to model problems involving dynamics are introduced, namely Frequency Fragmenting Least Squares Support Vector Machines (FF-LSSVM) and Partial Frequency Fragmenting Least Squares Support Vector Machines (Partial FF-LSSVM). In FF-LSSVM the frequency spectrum is divided into bands and a model focusing on each of such bands is estimated. Afterward all of these models are merged together. In Partial FF-LSSVM the procedure is similar, however, only a part of the spectrum is considered in this way. To complete the frequency spectrum, NARX LSSVM is used. On selecting between methods, the user is offered with the possibility of a tradeoff between the processing time and the accuracy of the results while keeping a good performance. Through this procedure, it is possible to find a resulting model with a very good performance. Both methods were tested in 4 real life data sets and a simulation one and showed to significantly improve the performance of NARX LS-SVM.**

***Index Terms*—Frequency Domain, LS-SVM.**

I. Introduction

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