Mathematics > Optimization and Control

A general approach of least squares estimation and optimal filtering

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(Submitted on 27 May 2013)

The least squares method allows fitting parameters of a mathematical model from experimental data. This article proposes a general approach of this method. After introducing the method and giving a formal definition, the transitivity of the method as well as numerical considerations are discussed. Then two particular cases are considered: the usual least squares method and the Generalized Least Squares method. In both cases, the estimator and its variance are characterized in the time domain and in the Fourier domain. Finally, the equivalence of the Generalized Least Squares method and the optimal filtering technique using a matched filter is established.

Comments:	7 pages
Subjects:	**Optimization and Control (math.OC)**; Methodology (stat.ME)
Cite as:	**arXiv:1305.6324 [math.OC]**
	(or **arXiv:1305.6324v1 [math.OC]** for this version)

Submission history

From: Benjamin Lenoir [view email]
[v1] Mon, 27 May 2013 20:53:44 GMT (9kb)

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