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On the parameter estimation estimation problem in the Jelinski–Moranda model in software reliability

Abstract. The exponential model of Jelinski and Moranda is one of the earliest models proposed for predicting software reliability. The estimation of its parameters has been approached in the literature by various techniques. The focus of this lecture will be on the L_p-norm ($1 \leq p < \infty$) fitting approach. Special attention will be paid to the nonlinear weighted least squares (LS) estimation. As the main result, a necessary and sufficient condition for the existence of the best L_p -norm estimate will be presented. This condition is theoretical in nature. We apply it to obtain two theorems on the existence of the LS estimate. One of them gives the necessary and sufficient conditions which guarantee the existence of the LS estimate. To illustrate the problems arising with the nonlinear normal equation approach for solving the LS problem, some illustrative examples are included.