On double disorder problems

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Abstract

The paper deals with an on-line detection of abrupt changes (see Shiryaev [4]) in a sequence of r.v.’s (not necessarily i.i.d. before and after the disruption moment) under probability maximizing approach. Some problems with such generalization has been touched by Moustakides [3]. The considerations are inspired by the problem regarding how can we protect ourselves against a second fault in a technological system after the occurrence of an initial fault (see Szajowski [5]). At two random moments \( \theta_1, \theta_2 \), where \( \theta_1 \leq \theta_2 \) and possibly \( \theta_1 = \theta_2 = 0 \), the distribution of observed sequence changes. It is known before \( \theta_1 \) and after \( \theta_2 \). Between these instants is unknown to the statistician and chosen randomly by “nature” from a set of distributions (see Bojdecki and Hosza [1], Dube and Mazumdar [2]). The stopping rule which stops between disorder moments \( \theta_1 \) and \( \theta_2 \) with maximal probability is identified.

References