ON A RANDOM NUMBER OF DISORDERS

Krzysztof Szajowski

Abstract: We register a random sequence which has three segments being the homogeneous Markov processes. Each segment has its own one-step transition probability law and the length of the segment is unknown and random. It means that at two random moments θ_1, θ_2, where $0 \leq \theta_1 \leq \theta_2$, the source of observation is changed. In effect, the number of homogeneous segments is random. The transition probabilities of each process are known and the *a priori* distribution of the disorder moments is given. The former research on such a problem has been devoted to various questions concerning the distribution changes. The random number of distributional segments creates new problems in solutions with relation to analysis of the model with deterministic number of segments. Two cases are presented in detail. In the first one the objective is to stop on or between the disorder moments while in the second one our objective is to find the strategy which immediately detects the distribution changes. Both problems are reformulated to optimal stopping of the observed sequences. The detailed analysis of the problem is presented to show the form of optimal decision function.

2000 AMS Mathematics Subject Classification: Primary: 60G40, 60K99; Secondary: 90D60.

Keywords and phrases: Disorder problem, sequential detection, optimal stopping, Markov process, change point, double optimal stopping.

THE FULL TEXT IS AVAILABLE HERE