

# Locally most powerful sequential tests of a simple hypothesis vs. One-sided alternatives for independent observations

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## Abstract

Let a stochastic process with independent values  $X_1, X_2, \dots, X_n, \dots$  be observed and let its distribution  $P_\theta$  depend on an unknown parameter  $\theta$ . In this paper we consider the problem of testing a simple hypothesis  $H_0: \theta = \theta_0$  vs. a composite alternative  $H_1: \theta > \theta_0$ , where  $\theta_0 \in \Theta$  is a fixed value of the parameter. In the first part of this work we present conditions for differentiability (at  $\theta_0$ ) of the power function of any sequential test and obtain some inequalities of informational type relating the average sample number with the type-I probability error to the derivative of the power function of sequential tests. In the second part of the work we characterize the structure of locally most powerful (in the sense of Berk [Ann. Statist., 3 (1975), pp. 373-381]) sequential tests in this problem (maximizing derivative of a power function under given constraints on the type-I probability error and the average sample number). © 2012 Society for Industrial and Applied Mathematics.

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## Keywords

Locally most powerful test, One-sided alternative, Optimal sequential decision, Sequential analysis, Sequential test, Statistical hypothesis testing