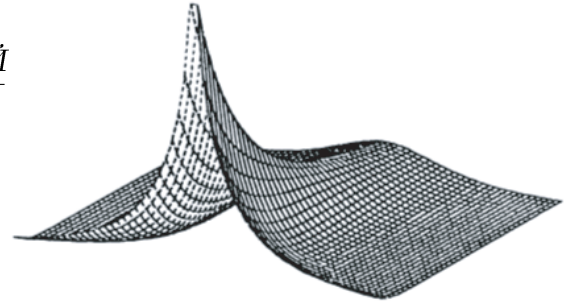




Кафедра ТЕОРИИ ВЕРОЯТНОСТЕЙ



## БОЛЬШОЙ СЕМИНАР КАФЕДРЫ ТЕОРИИ ВЕРОЯТНОСТЕЙ

Руководитель - академик РАН, профессор А. Н. Ширяев

20 марта — **А.Н. Ширяев** (МГУ)

*A quickest detection problem with an observation cost*

### **Резюме.**

In the classical quickest detection problem, one must detect as quickly as possible when a Brownian motion without drift "changes" into a Brownian motion with positive drift. The change occurs at an unknown "disorder" time with exponential distribution. There is a penalty for declaring too early that the change has occurred, and a cost for late detection proportional to the time between occurrence of the change and the time when the change is declared. Here, we consider the case where there is also a cost for observing the process. This stochastic control problem can be formulated using either the notion of strong solution or of weak solution of the s.d.e. that denotes the observation process. We show that the value function is the same in both cases, even though no optimal strategy exists in the strong formulation. We determine the optimal strategy in the weak formulation and show, using a form of the "principle of smooth fit" and under natural hypotheses on the parameters of the problem, that it is optimal to observe only when the posterior probability that the change has already occurred, given the observations, is larger than a threshold  $A \geq 0$ , and to declare that the disorder time has occurred when this posterior probability exceeds a threshold  $B \geq A$ . The constants  $A$  and  $B$  are determined explicitly from the parameters of the problem.

The talk is based on the joint work with Robert C. Dalang (Ecole Polytechnique Federale de Lausanne).

**Семинар проводится по средам в аудитории 16-10**

**с 16:45 до 17:45**