

MICHAEL KÉANE

Hasard et déterminisme : une approche mathématique

Publications des séminaires de mathématiques et informatique de Rennes, 1980, fascicule 2

« Séminaire d'histoire des mathématiques au XXe siècle », , exp. n° 11, p. 1

http://www.numdam.org/item?id=PSMIR_1980__2_A11_0

© Département de mathématiques et informatique, université de Rennes, 1980, tous droits réservés.

L'accès aux archives de la série « Publications mathématiques et informatiques de Rennes » implique l'accord avec les conditions générales d'utilisation (<http://www.numdam.org/conditions>). Toute utilisation commerciale ou impression systématique est constitutive d'une infraction pénale. Toute copie ou impression de ce fichier doit contenir la présente mention de copyright.

NUMDAM

Article numérisé dans le cadre du programme
Numérisation de documents anciens mathématiques
<http://www.numdam.org/>

HASARD ET DETERMINISME : UNE APPROCHE MATHEMATIQUE

Michael KEANE

Résumé :

If one accepts the hypothesis that the mechanisms of natural phenomena are deterministic, as all scientists do practically when working at a microscopic level, then it is not immediately seen that probability and statistics enter the picture at all. In fact, given enough information about the system to be studied and enough time and ability in calculation, all of the desired results can be determined. The idea of randomness and the techniques of probability and statistics, however, are very useful in such situations, and this usefulness arises in particular when the observer of such a system can describe the deterministic mechanism involved, but does not have enough knowledge concerning the initial data or the parameters of the system, or enough calculatory power, to describe the future with precision. In other words, and this is a point which we shall make more precise below, whether a phenomenon "appears" random or not to an observer, depends to a great extent on "how much" information he has collected concerning the phenomenon.

In these lectures, I shall endeavor to describe an ongoing mathematical effort to classify and recognize different types of randomness in deterministic situations of a special type. First of all, let me state clearly that I am assuming a "classical" situation (as opposed for instance in physics to a "quantum" situation whose description inherently contains probabilistic matter at present), in which the observer has complete knowledge of the deterministic mechanism involved, but lacks information on the initial state and power to observe the system completely at any given time. For simplicity, I shall also assume that time is discrete. After describing the basic ideas of the general theory, I would like to present a few examples from my personal research which I deem interesting for further study.

Le texte complet de cette conférence a été publié par le Séminaire de Philosophie et Mathématiques de l'Ecole Normale Supérieure, rue d'Ulm.

Il peut être obtenu sur demande à :

C.S.P. IREM, Av. Jean Baptiste Clément 93430 VILLETANEUSE