1. Record Nr. UNINA9910299775603321

Autore	Durrett Richard
Titolo	Branching Process Models of Cancer / / by Richard Durrett
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2015
ISBN	3-319-16065-6
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (73 p.)
Collana	Stochastics in Biological Systems, , 2364-2297 ; ; 1.1
Disciplina	614.5999
Soggetti	Probabilities Biomathematics Cancer research Probability Theory and Stochastic Processes Mathematical and Computational Biology Cancer Research
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Multistage Theory of Cancer -- Mathematical Overview -- Branching Process Results -- Time for Z_0 to Reach Size M -- Time Until the First Type 1 -- Mutation Before Detection? -- Accumulation of Neutral Mutations -- Properties of the Gamma Function -- Growth of Z_1(t) -- Movements of Z_1(t) -- Luria-Delbruck Distributions -- Number of Type 1's at Time T_M -- Gwoth of Z_k(t) -- Transitions Between Waves -- Time to the First Type \tau_k, k \ge 2 -- Application: Metastasis -- Application: Ovarian Cancer -- Application: Intratumor Heterogeneity.
Sommario/riassunto	This volume develops results on continuous time branching processes and applies them to study rate of tumor growth, extending classic work on the Luria-Delbruck distribution. As a consequence, the authors calculate the probability that mutations that confer resistance to treatment are present at detection and quantify the extent of tumor heterogeneity. As applications, the authors evaluate ovarian cancer screening strategies and give rigorous proofs for results of Heano and Michor concerning tumor metastasis. These notes should be accessible to students who are familiar with Poisson processes and continuous time. Richard Durrett is mathematics professor at Duke University, USA.

He is the author of 8 books, over 200 journal articles, and has supervised more than 40 Ph.D. students. Most of his current research concerns the applications of probability to biology: ecology, genetics, and most recently cancer.