

Dynamics of cancer recurrence*

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Abstract

This study is a generalization of the two-type age-dependent branching model developed in the recent work [1]. We are deriving mathematically the number of different types of mutations leading to the escape type and their moments. There are several differences from the results obtained in [2] where a discrete-time branching processes were used.

The appearance of mutations in cancer development plays a crucial role in the disease control and its medical treatment. Motivated by the practical significance, it is of interest to model the event of occurrence of a mutant cell that will possibly lead to a path of indefinite survival. A multi-type branching process model in continuous time is proposed for describing the relationship between the waiting time till the first escaping extinction mutant cell is born and the lifespan distribution of cells, which due to the applied treatment have small reproductive ratio $R < 1$.

REFERENCES

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