An age-size dependent cell cycle model

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We consider a stochastic model of the cell cycle. We assume that the cell cycle consists of two phases: the A phase corresponding to all or part of G_1 phase of the cell cycle and the B phase covering the rest of the cell cycle. The cell enters the phase A after birth and waits for some random time T_A depending on the cell age. Then the cell enters the phase B which lasts for a finite fixed time. At the end of the B phase the cell splits into two daughter cells. Individual states of the cell are characterized by age in each phase and by size, which can be volume, mass, DNA content or any quantity conserved trough division. Our model is described as a continuous-time Markov process [1]. We relate it to a discrete-time probabilistic model of the cell cycle describing the mass distribution of consecutive descendants of a single cell [2, 3]. Our analysis shows that there is a one to one correspondence between stationary distributions in these models. This is a joint work with P. Gwiżdż.

REFERENCE

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