

Stochastic Gompertzian Model For Breast Cancer Growth Process

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Abstract. In this paper, a stochastic Gompertzian model is developed to describe the growth process of a breast cancer by incorporating the noisy behavior into a deterministic Gompertzian model. The prediction quality of the stochastic Gompertzian model is measured by comparing the simulated result with the clinical data of breast cancer growth. The kinetic parameters of the model are estimated via maximum likelihood procedure. 4-stage stochastic Runge-Kutta (SRK4) is used to simulate the sample path of the model. Low values of mean-square error (MSE) of stochastic model indicate good fits. It is shown that the stochastic Gompertzian model is adequate in explaining the breast cancer growth process compared to the deterministic model counterpart.

Keywords: Stochastic processes; Biomedical modeling; Cancer