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THE PROPAGATIONS OF SATURATING FEEDBACK MECHANISM COLORECTAL CANCER MATHEMATICAL MODEL

NURUL DAYINI BINTI ZULKIFLI

BACHELOR OF SCIENCE (Hons.) MANAGEMENT MATHEMATICS

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Nurul Dayini Binti Zulkifli

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SUPERVISOR'S APPROVAL

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BY

NURUL DAYINI BINTI ZULKIFLI

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Approved by:

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Dr Nur Izzati Binti Khairudin

Supervisor

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ABSTRACT

Mathematical model of colorectal cancer is required to gain a better understanding of colorectal cancer and to provide insights into more effective of its early treatment strategies. Although the nature of cancer is complex, a mathematical model for tumour growth has assisted researchers in understanding and categorising the illness's behaviour. Therefore, this report looks into the propagations of saturating feedback mechanism colorectal cancer mathematical model. Moreover, we want to use Euler's method to examine and observe a system of ordinary differential equations as some parameters vary. In this research we used two mechanisms that could influence the growth of colon cancer. The first mechanism is saturating mechanism in which we vary the parameter $m_1 = 0.07$, $k_1 = 0.04$, $\beta = 0.357$ and $\gamma = 0.155$ according to the given range. Following that is the linear and saturating mechanism in which we only vary parameter $k_0 = 0.06$, $m_0 = 0.07$ and $\gamma = 0.1345$. In saturating feedback mechanism, the result for present research shows that our values of steady-state for cell populations are $N_0^* = 4$, $N_1^* = 166$ and $N_2^* = 883$. For linear and saturating mechanism, the value of cell population growth is slightly faster than previous research which are $N_0^* = 5$, $N_1^* = 168$ and $N_2^* = 1358$. Thus, we observed that in linear and saturating feedback mechanism has escalation in N_2 which is higher than saturating feedback mechanism. Besides, the exponential growth of tumour faster than the previous studies. This means that oncologist can predict and detect the evolvement of tumor in one patient. Moreover, by using this mathematical model, oncologists can proceed the next process to give a treatment to the cancer patients.

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