

# Limit Cycle Pada model Matematika Interaksi antara Sel Kanker dan Sel Imun

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## ABSTRACT

Cancer is a deadly disease in the world, including in Indonesia. The emergence of cancer is due to the failure of the immune system to detect cancer cells in the body so that they continue to grow. Immune cells play an essential role in curing cancer. Standard cancer treatment is through surgical procedures, radiotherapy and chemotherapy. Patients can recover from cancer after following a series of treatments. However, after a certain period, there is a recurrence or reinfection. The phenomenon of cancer cells appearing again or recurring can be mathematically studied from the emergence of a periodic solution, namely the limit cycle. This research aims to model the interaction between cancer cells and immune cells and examine the emergence of limit cycles mathematically. The research aims to obtain mathematical conditions regarding the emergence of a limit cycle which indicates recurrence or reinfection in cancer sufferers.

The research step is to develop and analyze a mathematical model of the interaction of cancer cells and immune cells and determine the conditions for the emergence of a limit cycle.

The research output is an analysis of the existence of limit cycles in the mathematical model between the immune system and cancer cells which will be published in a Scopus indexed journal. This research is basic research to obtain hypotheses and mathematical designs regarding the emergence of limit cycles through mathematical models of the interaction of cancer cells and the immune system. Therefore, the TKT target in this research is TKT 2.

Kata Kunci: *immunotherapy, cancer cells, immune cells, limit cycle*