



MODELLING CANCER DYNAMICS AND PERSONALIZED THERAPY: AN INNOVATIVE MULTI-AGENT-BASED TUMOUR-SITE COMPARTMENT APPROACH WITH OPTIMAL GROWTH

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Abstract. This paper introduces a new multi-agent-based tumour-site compartment model for human cancer. We analyze the qualitative behaviour of the model, ensuring positivity and boundedness, and discuss equilibria and their local stability using the Jacobian matrix. Moreover, we address a cancer containment procedure through optimal drug administration, aiming to eradicate tumour cells within an optimal timeframe by employing optimal control theory and Pontryagin's maximum principle. The paper concludes with a simulation validating our theoretical claims and providing valuable insights for future research in cancer therapeutics.

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