

**ANALYSIS OF TUMOR-IMMUNE RESPONSE MODEL BY USING
CONFORMABLE FRACTIONAL ORDER DERIVATIVE**

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Abstract: In this research paper, the authors propose a generalized three-dimensional fractional order tumor-immune response model. The generalization of the model is made by introducing interleukin-2 (IL_2) cell population as the third variable in the proposed system. The study of the proposed model is performed by using a new concept of fractional-order derivatives called as conformable fractional-order derivative. The authors aim to study, analyze, and compare the dynamical behavior of both the three-dimensional fractional order model and the conformable fractional order version of the proposed model. The stability analysis is done for both versions of the model at the biologically feasible equilibrium points. To validate the theoretical results numerically, numerical simulation is performed by using a piecewise constant approximation process.

Keywords and Phrases: Tumor-Immune Response System, Fractional Derivatives, Stability Analysis, Numerical Simulation.