1172-35-133 **Jianjun Paul Tian*** (`jtian@nmsu.edu`), 259 SH, New Mexico State University, Las Cruces, NM 88003, and **Tuan Anh Phan**. *Mathematical analysis for virotherapy with both innate and adaptive immune responses.* Preliminary report.

Several years ago, we proposed a new mathematical modeling framework based on partial differential equations to study tumor virotherapy which incorporates both innate and adaptive immune responses with a moving boundary. Recently, based on this PDE model, we proposed deterministic and stochastic ODE models to explain the complexity of interactions in cancer virotherapy and outcomes of current preclinical and clinical trials of oncolytic viral treatments. In Part I, we analyze the deterministic model. The model incorporates both innate and adaptive immune responses which have opposite effects on the outcome of the therapy. According to relative immune clearance rates, the model can be reduced to two subsystems, one with only innate immunity and one with only adaptive immunity, which provide detailed dynamical properties for the full model. The full system shows many asymptotically different behaviors which correspond to outcomes of the therapy. Besides classical Hopf bifurcation, it has Hopf bifurcation without parameters. We conduct numerical simulations to demonstrate our analytical results and provide detailed medical interpretations. The previous work with Jin Wang was published, and the recent work with Tuan Phan is in the preparation. (Received August 23, 2021)