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Transitions in a Logistic Growth Model Induced by Noise Coupling and Noise Color

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Abstract: With unified colored noise approximation, the logistic growth model is used to analyze cancer cell population when colored noise is included. It is found that both the coupling between noise terms and the noise color can induce continuous first-order-like and re-entrance-like phase transitions in the system. The coupling and the noise color can also increase tumor cell growth for small number of cell mass and repress tumor cell growth for large number of cell mass. It is shown that the approximate analytic expressions are consistent with the numerical simulations.

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