Difference equations arising in evolutionary population dynamics

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Difference (matrix) equation models in population dynamics that arise in the modeling of certain life history strategies, namely semelparity, give rise to an interesting dynamic dichotomy. This dichotomy consists of two invariant sets, each of which is a potential attractor (but never both) [1]. One is an equilibrium interior to the positive cone and the other lies on the boundary of the positive cone (and yields synchronized periodic orbits). Which is the attractor depends on the nature of the nonlinearities (specifically the strengths of the nonlinear interactions between and within age classes) [2, 3]. I will describe the difference equations that arise when such a population is subject Darwinian evolution [4] and give theorems that describe the nature of the dynamic dichotomy in an evolutionary context.

References

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