

**THE EFFECTS OF DIFFUSION AND SPATIAL VARIATION IN
LOTKA-VOLTERRA COMPETITION-DIFFUSION SYSTEM I:
HETEROGENEITY VS. HOMOGENEITY**

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Abstract

It is well known that the interactions between diffusion and spatial heterogeneity could create very interesting phenomena. In this series of two papers, using the classical Lotka-Volterra competition system, we will illustrate the combined effects of dispersal and spatial variations on the outcome of the competition.

In Part I, with the total resources being fixed at exactly the same level, we first show that a heterogeneous distribution of resources is usually superior to its homogeneous counterpart in the presence of diffusion. Then we study the more general case when both species have heterogeneous carrying capacities, but still with the same total resources. Limiting behaviors of co-existence steady states as the dispersal rates tend to 0 or ∞ are also obtained.

In Part II, we continue our investigation but under much broader situations - including different strengths and distributions of the resources, and with different competition abilities.