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# Predicting critical transitions in spatially distributed populations with cubical homology

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Laura Storch, College of William and Mary  
BAMM! Abstract

Understanding the dynamics of spatially distributed populations remains an active area of ecological research. Of particular interest is understanding the patterns that spatially distributed populations can form, and if we can use those patterns to understand critical dynamical transitions, such as extinction events. Here, we use a coupled patch model on a 2-dimensional grid with Ricker map growth. We employ cubical homology to quantitatively classify the spatial population patterns via Betti numbers. Preliminary results indicate that changes in spatial patterns do coincide with extinction events, and it may be possible to use Betti numbers as an early warning sign of an impending extinction.