



Mathematical Biology Seminar

Monday, January 20, 2025

3 pm MDT - 457 CAB (in person)

Join Zoom Meeting

<https://ualberta-ca.zoom.us/j/97624718507>

Meeting ID: 976 2471 8507



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Derivations of Explicit Memory in Animal Movement

Highly evolved animals continuously update their knowledge of social factors, refining movement decisions based on both historical and real-time observations. Despite its significance, research on the underlying mechanisms remains limited. In this study, we propose a general model of animal movement that incorporates explicit memory. We focus on derivation of this framework using three derivation approaches: discrete velocity jump processes, spatial and temporal discretization, and patch models. These derivations highlight the connections between animal dispersal strategies and their use of cumulative memory, specifically in the forms of diffusion advection, Fickian diffusion, and Fokker-Planck diffusion models. Additionally, we established the local well-posedness of the broader framework that unifies these cases. We carry out numerical simulations to demonstrate that the three different dispersal strategies exhibit different behaviors in terms of repulsive and attractive situations.