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Adaptation to a gradual environment - Research of lineages

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Abstract: Directional environmental changes, such as caused by climate warming, imposes strong selection on many living organisms, which need to evolve fast enough to keep track of their changing environment. We introduce a quantitative genetics model exploring this question and consider some phenotypic trait subject to stabilizing selection around some optimal phenotype, which value is shifted continuously through time. We construct the stochastic individual based model and its deterministic PDE approximation for which we exhibit a stationary distribution. Assuming now that the density profile stays at this equilibrium, we are interested in the lineage of an individual uniformly sampled at a fixed time. Our aim is to capture the distribution of the initial value of this trajectory and to exhibit a biais in the distribution. We use a spinal approach classical for branching processes. We will also give the equation of such lineage. It's a work in progress with V. Calvez, B. Henry, F. Patout and C.V. Tran.