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Haldane's formula in Cannings models with moderate selection

Abstract: Haldane's formula states that the probability of fixation for a single beneficial individual with small selective advantage s and offspring variance v is approximately equal to $2s/v$. This asymptotics can be proven for a class of Cannings models with moderate selection, i.e. with $s_N = N^b$.

In this talk we will introduce the construction of these models via paintboxes that lead to forward and backward descriptions of the genealogical processes. For $1/2 < b < 1$ under assumptions which ensure convergence of the neutral model to Kingman's coalescent we prove Haldane's formula via the discrete ancestral selection graph and duality with the frequency process. In the case of $0 < b < 1/2$ a coupling with slightly supercritical Galton-Watson processes is used.

These results are joint work (in progress) with Florin Boenkost, Adrián González Casanova Casanova and Anton Wakolbinger.