



Oberseminar Stochastik

Am **Dienstag, 11. Juli 2023**, wird

Herr **Jan Lukas Igelbrink (JGU und GU Frankfurt/M.)**

einen Vortrag halten mit dem Titel:

**"Muller's ratchet with tournament selection:
near-criticality and links to the classical ratchet"**

Muller's ratchet is a prototype model in mathematical population genetics. In an asexual population of constant size N , individual lineages are assumed to slowly acquire slightly deleterious mutations over the generations. Due to randomness, every once and a while the individuals with the currently smallest number of mutations disappear from the population; this is a click of the ratchet. The classical variant of the model, which assumes so-called proportional selection, so far has resisted against a fully rigorous asymptotic analysis of the clicking rate. In [1] this hurdle has been overcome by considering tournament (instead of proportional) selection, where selective competition within pairs is won by the fitter individual.

In our talk we will explain the graphical construction which was used in [1] to obtain a hierarchy of dual processes for the tournament ratchet. We will apply this duality also in the "near-critical" regime in which the ratio of the mutation rate m_N and the selection coefficient s_N obeys $m_N/s_N \uparrow 1$ as $N \rightarrow \infty$. We will reveal the form of the type-frequency profile between clicks of the ratchet, as well as the asymptotic click rates in various subregimes. Finally, we will discuss the mapping which takes (m, s) into the corresponding parameter pair of the "classical" ratchet so that the click rates have similar asymptotics under appropriate approximations, and will illustrate this by simulations.

The talk is based on joint work in progress with A. González Casanova, Ch. Smadi and A. Wakolbinger.

Zeit: Dienstag, 11. Juli 2023, 14 Uhr c.t.

Ort: Raum 05-136, Institut für Mathematik, Staudingerweg 9, 55128 Mainz

Alle Interessierten sind herzlich eingeladen!

gez. Matthias Birkner

<https://www.stochastik.mathematik.uni-mainz.de/>