



# Species dynamics in the two-parameter Poisson-Dirichlet diffusion model

Matteo Ruggiero

(Submitted on 1 May 2013)

The recently introduced two-parameter infinitely-many neutral alleles model extends the celebrated one-parameter version, related to Kingman's distribution, to diffusive two-parameter Poisson-Dirichlet frequencies. Here we investigate the dynamics driving the species heterogeneity underlying the two-parameter model. First we show that a suitable normalization of the number of species is driven by a critical continuous-state branching process with immigration. Secondly, we provide a finite-dimensional construction of the two-parameter model, obtained by means of a sequence of Feller diffusions of Wright-Fisher flavor which feature finitely-many types and inhomogeneous mutation rates. Both results provide insight into the mathematical properties and biological interpretation of the two-parameter model, showing that it is structurally different from the one-parameter case in that the frequencies dynamics are driven by state-dependent rather than constant quantities.

Subjects: **Probability (math.PR)**; Statistics Theory (math.ST)

Cite as: **arXiv:1305.0179 [math.PR]**

(or **arXiv:1305.0179v1 [math.PR]** for this version)

## Submission history

From: Matteo Ruggiero [[view email](#)]

[v1] Wed, 1 May 2013 14:21:56 GMT (547kb,D)

[Which authors of this paper are endorsers?](#)

## Download:

- [PDF](#)
- [Other formats](#)

Current browse context:

math.PR

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1305](#)

Change to browse by:

[math](#)

[math.ST](#)

[stat](#)

## References & Citations

- [NASA ADS](#)

Bookmark([what is this?](#))

