

Reference classes: a case study with the `powerLaw` package

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Power-law distributions have been used extensively to characterise many disparate scenarios, *inter alia*, the sizes of moon craters and annual incomes (Newman, 2005). Recently power-laws have even been used to characterize terrorist attacks and interstate wars (Cederman, 2003). However, for every correct characterisation that a particular process obeys a power-law, there are many systems that have been incorrectly labelled as being scale-free; see for example, Stumpf and Porter, 2012.

Part of the reason for incorrectly categorising systems with power-law properties is the lack of easy to use software. The **`powerLaw`** package aims to tackle this problem by allowing multiple heavy tail distributions, to be fitted within a standard framework (Gillespie, 2013)). Within this package, different distributions are represented using reference classes. This enables a consistent interface to be constructed for plotting and parameter inference.

This talk will describe the advantages (and disadvantages) of using reference classes. In particular, how reference classes can be leveraged to allow fast, efficient computation via parameter caching. The talk will also touch upon potential difficulties such as combining reference classes with parallel computation.

References

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