



Parameter estimation for fractional birth and fractional death processes

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The fractional birth and the fractional death processes are more desirable in practice than their classical counterparts as they naturally provide greater flexibility in modeling growing and decreasing systems. In this paper, we propose formal parameter estimation procedures for the fractional Yule, the fractional linear death, and the fractional sublinear death processes. The methods use all available data possible, are computationally simple and asymptotically unbiased. The procedures exploited the natural structure of the random inter-birth and inter-death times that are known to be independent but are not identically distributed. We also showed how these methods can be applied to certain models with more general birth and death rates. The computational tests showed favorable results for our proposed methods even with relatively small sample sizes. The proposed methods are also illustrated using the branching times of the plethodontid salamanders data of \cite{hal79}.

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

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