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# On a Z-Transformation Approach to a Continuous-Time Markov Process with Nonfixed Transition Rates

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*Gen. Math. Notes, Vol. 24, No. 2, October 2014, pp. 85-96*

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## Abstract:

*The paper presents z-transform as a method of functional transformation with respect to its theory and properties in dealing with discrete systems. We therefore obtain the absolute state probabilities as a solution of a differential equation corresponding to a given Birth-and-Death process via the z-transform, and deduce the equivalent stationary state probabilities of the system.*

**Keywords:** Markov Processes, Birth-Death Process, Z-Transform, Generating Function, Characteristic Differential Equation.

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