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Modeling and Forecasting Mortality Rates

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We show that by modeling the time series of mortality rate changes rather than mortality rate levels we can better model human mortality. Leveraging on this, we propose a model that expresses log mortality rate changes as an age group dependent linear transformation of a mortality index. The mortality index is modeled as a Normal Inverse Gaussian. We demonstrate, with an exhaustive set of experiments and data sets spanning 11 countries over 100 years, that the proposed model significantly out performs existing models. We further investigate the ability of multiple principal components, rather than just the first component, to capture differentiating features of different age groups and find that a two component NIG model for log mortality change best fits existing mortality rate data.