Graduation of mortality rates revisited

by

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In this paper we critically review the existing methods of graduation or smoothing of mortality rates. We consider parametric methods such as methods based on mortality models [Gompertz, Makeham, Oppermann, Theile and Steffenson, Beard (1951), Barnett (1974), Heligman and Pollard (1980) et al], generalized linear models, splines, smooth – junction interpolation. We also consider non – parametric methods of graduation such as the graphical method, weighted moving averages, Whittaker and Henderson where both the fit and the degree of smoothness are taken into account, the kernel method and graduation with reference to standard mortality rates (distribution). This last approach leads to methods of graduation using information theoretic ideas. Starting with Brockett's idea to use the Kullback – Leibler divergence we explore the use of other divergence indices as for example the power divergence index with analogous linear and/or quadratic constraints.