Flexible spatio-temporal modelling of mortality rates

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Abstract: Disease mapping techniques have evolved in the last few decades incorporating recent development of statistical and geographical methodologies, together with the accessibility to high quality mortality and incidence registers. Nowadays, the inclusion of both the spatial and the time dimensions is receiving much attention because it provides a complete analysis of a disease evolution. Traditionally, the spatial smoothing is carried out using conditional autoregressive models (CAR), which capture spatial dependence locally across areas. Very recently, penalized splines have been considered to estimate large-scale spatial trends together with region random effects. In this paper, we propose to use penalized splines for smoothing in both the spatial and the temporal dimensions. To illustrate the procedure male mortality data due to brain cancer in Spain over the period 1996-2005 will be analyzed.

Keywords: CAR; P-splines; smoothing.