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Title: Demographic forecasting using functional data models

Abstract: Functional time series are curves that are observed sequentially in time. In demography, such data arise as the curves formed by annual death rates as a function of age or annual fertility rates as a function of age. I will discuss methods for describing, modelling and forecasting such functional time series data. Challenges include:

- developing useful graphical tools (I will illustrate a functional version of the boxplot);
- dealing with outliers (e.g., death rates have outliers in years of wars or epidemics);
- cohort effects (how can we identify and allow for these in the forecasts);
- synergy between groups (e.g, we expect male and female mortality rates to evolve in a similar way in the future);
- deriving prediction intervals for forecasts;
- how to combine the mortality and fertility forecasts to obtain forecasts of the total population.

I will illustrate the ideas using data from Australia and France.