In-sample density forecasting

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This talk generalizes recent proposals of density forecasting models and it develops theory for this class of models. In density forecasting the density of observations is estimated in regions where the density is not observed. Identi cation of the density in such regions is guaranteed by structural assumptions on the density that allows exact extrapolation. In this talk the structural assumption is made that the density is a product of one-dimensional functions. The theory is quite general in assuming the shape of the region where the density is observed. Such models naturally arise when the time point of an observation can be written as the sum of two terms (e.g. onset and incubation period of a disease). The developed theory also allows for a multiplicative factor of seasonal e ects. Seasonal e ects are present in many actuarial, biostatistical, econometric and statistical studies. Smoothing estimators are proposed that are based on back tting. Full asymptotic theory is derived for them.

Keywords: Density estimation; kernel smoothing; back tting; chain ladder.