CURVED EXPONENTIAL FAMILIES OF STOCHASTIC PROCESSES AND THEIR ENVELOPE FAMILIES

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Abstract. Exponential families of stochastic processes are usually curved. The full exponential families generated by the finite sample exponential families are called the envelope families to emphasize that their interpretation as stochastic process models is not straightforward. A general result on how to calculate the envelope families is given, and the interpretation of these families as stochastic process models is considered. For Markov processes rather explicit answers are given. Three examples are considered some in detail: Gaussian autoregressions, the pure birth process and the Ornstein-Uhlenbeck process. Finally, a goodness-of-fit test for censored data is discussed.

Key words and phrases: Censored data, diffusion processes, Gaussian autoregression, goodness-of-fit test, Markov processes, Ornstein-Uhlenbeck process, pure birth process.