

## **"Approximating Data"**

Abstract: Statistics can be defined as the theory and practice of stochastic models. Although it is generally recognized that stochastic models are never true and are at best a reasonable approximation to the data statistics has no theory of approximation. It will be argued that no concept of approximation can be based at the level of densities (likelihood) and that it must be formulated at the level of distribution functions. Likelihood and associated concepts such as sufficiency are grounded in a strong topology whereas a concept of approximations should be based on the weak topology of data analysis. Examples will be given from non-parametric regression, non-parametric densities and long range financial data.