

International Biometric Society

LIKELIHOOD FUNCTIONS AND CHAOTIC SYSTEMS

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Many statistical models in ecology and biology that incorporate nonlinear dynamics can display highly nonlinear or even chaotic properties. These in turn, when placed in a statistical setting, can result in unstable likelihood functions, Fisher information and subsequent statistical inference. The issue of how to measure and express this instability is reviewed and addressed. The application of smoothing techniques from statistics is examined alongside concepts from the chaos literature such as box counting dimension. Bayesian averaging methods are also discussed as providing potentially more stable inferences.