

Aris Spanos

Foundational Issues in Statistical Modeling: Statistical Model Specification and Validation*

Abstract:

Statistical model specification and validation raise crucial foundational problems whose pertinent resolution holds the key to learning from data by securing the reliability of frequentist inference. The paper questions the judiciousness of several current practices, including the theory-driven approach, and the Akaike-type model selection procedures, arguing that they often lead to unreliable inferences. This is primarily due to the fact that goodness-of-fit/prediction measures and other substantive and pragmatic criteria are of questionable value when the estimated model is statistically misspecified. Foisting one's favorite model on the data often yields estimated models which are both statistically and substantively misspecified, but one has no way to delineate between the two sources of error and apportion blame. The paper argues that the *error statistical* approach can address this Duhemian ambiguity by distinguishing between statistical and substantive premises and viewing empirical modeling in a piecemeal way with a view to delineate the various issues more effectively. It is also argued that Hendry's general to specific procedures does a much better job in model selection than the theory-driven and the Akaike-type procedures primary because of its error statistical underpinnings.