P-Values as Measures of Predictive Validity

G. A. Whitmore

McGill University, Montreal, Canada

E. XEKALAKI

The Athens School of Economics and Business Science, Athens, Greece

Abstract

A *predictive P-value* is proposed to measure the difference between an actual and predicted outcome in assessing the validity of an hypothesized prediction model. The concept is illustrated by applications to multiple regression prediction and to the validation of forecast models.

Key words: Forecast; Model; Prediction; Regression; Validation.

1. Introduction

In spite of the concerns of some statisticians about their merit, P-values play a prominent role in statistical analysis and reporting, measuring as they do the discrepancy between an hypothesized model and the statistical evidence bearing on the model's validity. It is proposed here that the role of P-values be expanded to include a *predictive P-value* as a measure of the agreement between a prediction made by a model and the actual outcome. Roughly stated, a predictive P-value is the probability, under the hypothesized prediction model, that the prediction error might have been larger than was actually observed. A small predictive P-value suggests therefore that the prediction model might not be appropriate. A predictive P-value is interpreted in the same manner as P-values in standard hypothesis testing and is based on a similar conceptual framework. It therefore should be of value in statistical education and readily accepted in statistical practice.