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A power-series beta Weibull regression model for predicting breast carcinoma

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The postmastectomy survival rates are often based on previous outcomes of large numbers of women who had a disease, but they do not accurately predict what will happen in any particular patient's case. Pathologic explanatory variables such as disease multi-focality, tumor size, tumor grade, lymphovascular invasion and enhanced lymph node staining are prognostically significant to predict these survival rates. We propose a new cure rate survival regression model for predicting breast carcinoma survival in women who underwent mastectomy. We assume that the unknown number of competing causes that can influence the survival time is given by a power series distribution and that the time of the tumor cells left active after the mastectomy for metastasizing follows the beta Weibull distribution. The new compounding regression model includes, as special cases, several well-known cure rate models discussed in the literature. The model parameters are estimated by maximum likelihood. Further, for different parameter settings, sample sizes and censoring percentages, some simulations are performed. We derive the appropriate matrices for assessing local influences on the parameter estimates under different perturbation schemes and present some ways to assess local influences.

Biography

Edwin M M Ortega achieved a PhD in Statistics from University of São Paulo in 2002 and is a Full Professor at Federal University of São Paulo, Brazil. He published more than 130 papers in internationally referred journals. He has experience in probability and statistics, focusing on parametric inference, acting on the following subjects: distribution theory, survival analysis, residual analysis and sensibility analysis.

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