SEMIPARAMETRIC TRANSFORMATION FOR NON-LINEAR REGRESSION MODEL

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For fitting any theoretical model, we introduce Power Transform-Both-sides (PTB) approach and Power Transform-Both-sides and Weighted Least Squares (PTBWLS) approach which implemented a power-weighted transform approach in PTB. Then, as an alternative to the PTB, we provide a Nonparametric Transform-Both-sides (NTB) approach to express function transformation as a cubic spline curve. As an estimation method which combines PTBWLS with NTB together, we propose a Nonparametric Transformation-Both-sides and Weighted Least Squares (NTBWLS) approach. The NTBWLS is designed to implement both nonparametric estimation of transformation function and parametric estimation of power-weighted transformation function. Based on numerical investigation of two examples which include famous data of Ricker model, and data generated from one-compartment model, we conclude that PTB and NTB induce additive errors normally distributed and stabilize the error variance, and PTBWLS and NTBWLS improve degrees of normality and homoscedasticity of the error larger than PTB and NTB.