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Nonparametric Truncated Spline Regression Model on the Data of Human Development Index in Indonesia

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Abstract : Human Development Index (HDI) is a standard measurement for a country's human development. Several factors may have influenced it, such as life expectancy, gross domestic product (GDP) based on the province's annual expenditure, the number of poor people, and the percentage of an illiterate people. The scatter plot between HDI and the influenced factors show that the plot does not follow a specific pattern or form. Therefore, the HDI's data in Indonesia can be applied with a nonparametric regression model. The estimation of the regression curve in the nonparametric regression model is flexible because it follows the shape of the data pattern. One of the nonparametric regression's method is a truncated spline. Truncated spline regression is one of the nonparametric approach, which is a modification of the segmented polynomial functions. The estimator of a truncated spline regression model was affected by the selection of the optimal knots point. Knot points is a focus point of spline truncated functions. The optimal knots point was determined by the minimum value of generalized cross validation (GCV). In this article were applied the data of Human Development Index with a truncated spline nonparametric regression model. The results of this research were obtained the best-truncated spline regression model to the HDI's data in Indonesia with the combination of optimal knots point 5-5-5-4. Life expectancy and the percentage of an illiterate people were the significant factors depend to the HDI in Indonesia. The coefficient of determination is 94.54%. This means the regression model is good enough to applied on the data of HDI in Indonesia.

Keywords : generalized cross validation (GCV), Human Development Index (HDI), knots point, nonparametric regression, truncated spline
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