ABSTRACT

Multiple linear regression is limited in spatial data analysis due to its assumption of global stationarity, which can lead to biased estimations by ignoring spatial heterogeneity. While Geographically Weighted Regression (GWR) addresses this by allowing local parameter variation, it remains sensitive to *outlier*s that can bias results. This study applies the Robust Geographically Weighted Regression (RGWR) model to overcome these limitations by incorporating an additional weighting mechanism that reduces the influence of extreme observations. The selection of East Java Province as the research location is based on its significant contribution to the national economy, as it had the second-largest Gross Regional Domestic Product (GRDP) in Indonesia in 2023. The RGWR model was developed using an adaptive exponential kernel to examine the spatial influence of five socioeconomic factors on GRDP using 2023 data. The factors are the Labor Force Participation Rate, Poverty Rate, Number of Domestic Tourist Trips, Regional Government Expenditure, and Foreign Direct Investment. The model demonstrates high predictive performance, with an R^2 of 0.9290 and an R^2_{adj} value of 0.8836. The findings confirm the spatially varying impact of each factor on GRDP and highlight the superiority of RGWR in handling both spatial effects and *outlier*s in regional economic modeling.

Keywords: Robust GWR, Outlier, GRDP, Adaptive Exponential Kernel