Estimation Of Nitrogen Dioxide (NO$_2$) and Carbon Monoxyde (CO) Concentration on Surabaya’s Air Using Cokriging Interpolation

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Abstract

Surabaya, the second largest city in Indonesia, has 2,765,487 in 2010 (Population Census 2010) with mean of NO$_2$ concentration is 0.0059 ppm and mean of CO concentration is 10.97 ppm in 2009. According to New Jersey Department of Environmental Protection, harmful pollutants that has major contribute to air pollution is NO$_2$ and CO. To measure the concentrations of NO$_2$ and CO in the air through a long process, in which each pollutant has a different way of measuring, according to Indonesian National Standard (SNI), so all Surabaya area can not be measured. Therefore, it will be estimate NO$_2$ and CO concentration using cokriging interpolation. Estimated NO$_2$ gives better results using cokriging with isotropic variogram, with the estimated value of 0.0003 - 0.04 ppm. $R^2$ resulting in cross-validation is 58.7%. Estimated CO showed the best results on cokriging with the isotropic variogram, with an estimated fall in the interval 7.6 - 14.6 ppm and $R^2$ resulting in cross-validation $R^2$ 94.2%.

Keywords : Cokriging, Cross-validation, Interpolation, Variogram