STATISTICS Department

# A Suggested Nonparametric Regression Model to Determine the Location of Pollutant and its Concentration

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**ABSTRACT**: *In this paper, we suggest a nonparametric regression model to estimate and predict the hourly sulfur dioxide ($so_2$) concentration level according to: wind direction, wind speed, and temperature. Many previous studies have used the nonparametric regression models to estimate the pollutants concentrations and locating its sources. These studies were considered wind direction and/ or wind speed as explanatory variables and the pollutants concentration level as dependent variable.*

*In this paper, the temperature is added to wind direction and wind speed as explanatory variable. It is added because temperature helps pollutants to concentrate on the air.*

*The suggested model is applied in the Abbassiya region in the Arab Republic of Egypt during the period 1\1\2005 to 31\12\2005, where: (i) the significance of the explanatory variables is tested; (ii) the hourly concentration levels of sulfur dioxide are estimated during the year 2005; (iii) the hourly concentration levels of the pollutant are forecasted for the first three months of the year 2006; (iv) also confidence interval for the pollutant concentration is determined.*

*Finally, we used the estimated concentration levels to determine the location of the main sources of that pollutant. It is shown that the sources of sulfur dioxide are: East Cairo Electricity station; the Electricity station near El-Nahdin region; and the railway workshops.*