



**UPM**  
UNIVERSITI PUTRA MALAYSIA  
BERILMU BERBAKTI

# INSPEM WEEKLY SEMINAR

21/2019

## Date & Time

Friday , 14 June 2019 @ 3.15 pm

## Venue

**Al-Farabi Seminar Room, Second Floor,  
INSPEM**



## Presenter

**Dr. Norhaslinda Ali**  
Associate Researcher  
Laboratory of Computational Statistics and  
Operations Research

## Topic

**Tree-based Threshold Model for Non-stationary Extremes with  
Application to the Air Pollution Index Data**

## Abstract

Air pollution index (API) is a common tool used to describe the air quality in the environment. High level of API indicates the greater level of air pollution which will gives bad impact on human health. Statistical model for high values of API is important for the purpose of forecasting the level of API so that the public can be warned. In this study, extremes of API are modelled using Generalized Pareto Distribution (GPD). Since the values of API are determined by the value of five pollutants namely sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone and suspended particulate matter, data on API exhibit a non-stationary. Standard method for modelling the non-stationary extremes using GPD is fixed the high constant threshold and incorporating the covariate model in the GPD parameters for data above the threshold to account for the non-stationarity. However, high constant threshold value might be high enough on certain covariate for GPD approximation to be a valid model for extreme values, but not on the other covariates which leads to the violation of the asymptotic basis of GPD model. New method for the threshold selection in non-stationary extremes using regression tree is proposed to the API data. Regression tree is used to partition the API data into a stationary group with similar covariate condition. Then, a high threshold value can be applied within a group. Study shows that model for extremes of API using tree-based threshold gives a good fit and outperforms the model based on standard method.



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