Estimation of parameters of epidemiological models under a non-parametric approach and its application for COVID-19 in Bogotá D.C.

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Coronaviruses (COVID-19) belong to a family of viruses that can cause from mild respiratory diseases to cases of Severe Acute Respiratory Infection such as SARS-CoV-2, the virus that causes the COVID-19 disease. It is important to understand how fast the epidemic can spread and make predictions of possible pandemic scenarios at the local level to prepare mitigation and control measures. One approach is to model mathematical models and estimate the parameters of the epidemic dynamics model, that is, estimate transition and recovery rates of the model and study interaction between susceptible and infectious individuals. In the literature, the authors use different approaches for estimating the model parameters, namely, trial-error or minimizing the sum of squares of the error using computational methods for the data set of infected individuals [Aliou, Cooper, Yang]. Others like [Barnabas, Butler, Iragorri] create scenarios based on parameters to predict an epidemic's behavior. Also, time-dependent parameter estimation framework studied by [Faranda, Marsili, Zhan]. In this talk, we present a methodology for a non-parametric estimation and its capability to find optimal parameters for the SEIR epidemic model with case studies for the COVID-19 data in Bogotá D.C.

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