



Seminário PPGFIS - Quarta-feira - 10:00 - Professor José Garcia - Flattening the curve: the effect of inter-cities flux network in brazilian COVID-19 difusion

Link: https://conferenciaweb.rnp.br/webconf/semp_ppgfis

Data e hora: quarta-feira, dia 03/06/2020, às 10.00h

Palestrante: Prof. José Garcia Vivas Miranda

Title: Flattening the curve: the effect of inter-cities flux network in brazilian COVID-19 difusion

ABSTRACT

The new Covid-19 pandemic has left traces of suffering and devastation to individuals of almost all countries worldwide and severe impact on the global economy. Understanding the clinical characteristics, interactions with the environment, and the variables that favor or hinder its dissemination help the public authorities in the fight and prevention, leading for a rapid response in society. Using models to estimate contamination scenarios in real time plays an important role. Population compartments models based on ordinary differential equations (ODE) for a given region assume two homogeneous premises, the contact mechanisms and diffusion rates, disregarding heterogeneous factors as different contact rates for each municipality and the flow of contaminated people among them. This work considers a hybrid model for covid-19, based on local SIR models and the population flow network among municipalities, responsible for a complex lag dynamics in their contagion curves. Based on actual infection data, local contact rates (β) are evaluated. The epidemic evolution at each municipality depends on the local SIR parameters and on the inter-municipality transport flow. When heterogeneity of β values and flow network are included, forecasts differ from those of the homogeneous ODE model. This effect is more relevant when more municipalities are considered, hinting that the latter overestimates new cases. In addition, mitigation scenarios are assessed to evaluate the effect of earlier interventions reducing the inter-municipality flux. Restricting the flow between municipalities in the initial stage of the epidemic is fundamental for flattening the contamination curve, highlighting advantages of a contamination lag between the capital curve and those of other municipalities in the territories.