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A complex networks approach for modeling vehicular traffic in small cities

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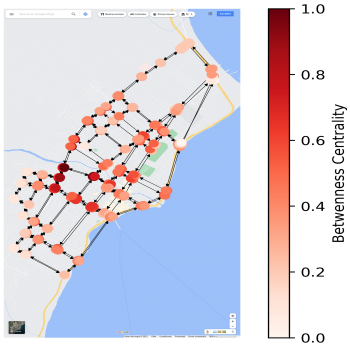
Abstract

In this work, we study traffic dynamics in small cities through a complex network approach. Here we consider nodes as street intersections and edges as intersections. We calculate some degree centrality measurements of the network like the *betweenness centrality* (BC) and the vertex degree. We compare these results with those provided by *Google Maps* data for traffic in cities. To minimize data variability, we considered the average weekday rush hour. We test our approach on Punta Arenas, a small city instance.

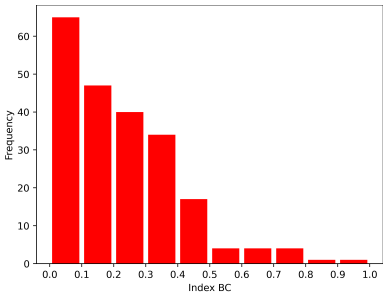
We developed a software in Python to obtain de average rush hour traffic (see Fig. 1a); we used *Netwokx* to build network representation, normalizing data to [0,1](see Fig. 1b). Then, we compared the difference between real data and data obtained with our approach (see Fig. 1c), observing small differences among them.

Given the deffinition of BC, we should expect that this central measurement of the networks may provide a reasonable explanation of traffic in cities, as well as other network measurements may allow to convey important information to explain traffic.

(a) *Average observation density*



(b) *Spatial distribution of BC for the network*



(c) *Distribution of the error between BC and the observed value of density*

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References

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