UNIVERSALITIES IN THE CLUSTERING COEFFICIENT FOR SEISMIC COMPLEX NETWORK BUILT WITH REAL DATA AND WITH DATA FROM THE BURRIDGE-KNOPOFF MODEL

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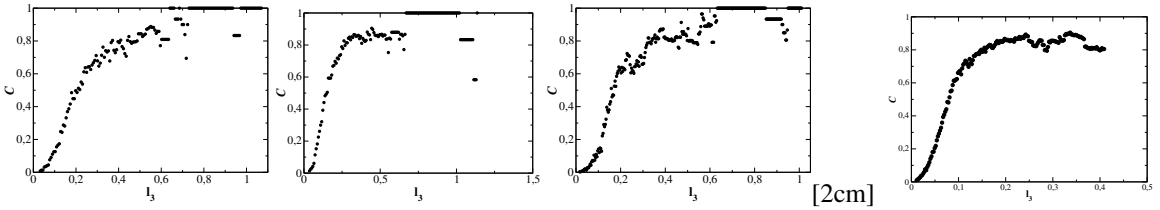
Complex networks using seismic data measured in three zones of Chile had been built [2]. Three undirected networks with seismic data sets that include an earthquake (1985, central zone of Chile, 1995 northern zone of Chile and 2010 southern zone of Chile) and one data set without an earthquake (central zone of Chile between years 2000 and 2007) had been constructed. This work has focused on the behavior of the clustering coefficient in these complex networks. A finite-size scaling was found [1] and the clustering coefficient shows an interesting behavior: this parameter converge to 0.8 for seismic data sets without a large seismic event and converge to 1 if the data set includes a large seismic event. This behavior was consistent for the data set measured in Chile and was compared with seismic complex networks built with data from other zones of the Earth [1], keeping the same behavior. This behavior was tested for data obtained from a classical Burridge-Knopoff model for earthquakes, two results were used: a BK model without a large event and a BK model with a large event and its aftershocks. The same results were obtained for the clustering coefficient with the data from de BK model. The results of the clustering coefficient, C, for the three seismic data sets measured in Chile that contain a large event are shown in Figs. 1, a), b) and c). The result for the data set measured in the central zone of Chile without a large event is shown in Fig. 1 d). Figs. 2 show the results for the clustering coefficient for the BK model.



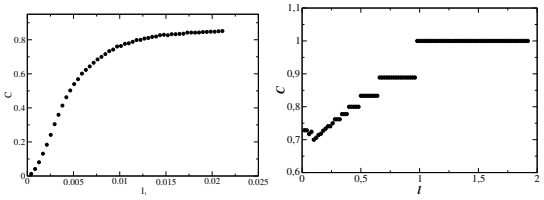
(a) Northern zone of Chile (1995).

(b) Central zone of Chile (1985).

(c) Southern zone of Chile (2010).

(d) Central zone of Chile without a large event, between years 2000 and 2007.

Figure 1: Clustering coefficient for the four complex networks built with sesimic events measured in Chile



(a) BK model with 200 blocks, without a large event.

(b) BK model with 50 blocks, with a large event.

Figure 2: Clustering coefficient the complex networks built with the data obtained from a BK model.

References

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