The Wiener index and its variants for the class of trees

Supervisor: Dr Valisoa Rakotonarivo

The Wiener index of a graph is the sum of distances between all pairs of vertices in the graph. It has been thoroughly studied, especially for the class of trees (acyclic connected graph), where several results have been obtained.

In this project, we want to explore several variants of the Wiener index. Namely,

- the terminal Wiener index, which is the sum of distances between all pairs of leaves,

- the peripheral Wiener index, which is the sum of distances between all pairs of peripheral vertices (vertices with maximum eccentricity),

- the Steiner Wiener index, where the notion of distance which is between pairs of vertices will be generalise to k-tuple of vertices.

The aims are to obtain similar results in terms of bounds and extremal trees on these invariants and to examine the difference/correlation between the different indices.