

## Pendular behaviour of public transport network

In this work, we propose a methodology that bears close resemblance to the Fourier analysis of the first harmonic to study networks subjected to pendular behavior [1]. In this context, pendular behavior is characterized by the phenomenon of people's dislocation from their homes to work in the morning and people's dislocation in the opposite direction in the afternoon. Pendular behavior is a relevant phenomenon that takes place in public transport networks because it may reduce the overall efficiency of the system as a result of the asymmetric utilization of the system in different directions. We apply this methodology to the bus transport system of Brasília (Brazil), which is a city that has commercial and residential activities in distinct boroughs. We show that this methodology can be used to characterize the pendular behavior of this system, identifying the most critical nodes and times of the day when this system is in more severe demanded[1,2].

[1] M. M. Izawa, F. A. Oliveira, D. O. Cajueiro, and B. A. Mello, Phys. Rev. E **96**, 012309 (2017).

[2] Highlight of PRE <https://physics.aps.org/synopsis-for/10.1103/PhysRevE.96.012309>.

**Primary author:** IZAWA, Mirian (Universidade de Brasília)

**Co-authors:** MELLO, Bernardo (Universidade de Brasília); CAJUEIRO, Daniel (Universidade de Brasília); OLIVEIRA, Fernando (Universidade de Brasília)

**Presenter:** OLIVEIRA, Fernando (Universidade de Brasília)