MATHEMATICAL SCIENCES

MUR DM 118 - Distributed control of infrastructure networks

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Dipartimento DISMA
Supervisor	COMO GIACOMO - giacomo.como@polito.it
Contact	FAGNANI FABIO - fabio.fagnani@polito.it
Context of the research activity	Resilient distributed control problems for large scale infrastructure systems as electrical grids or transportation networks. Progetto finanziato nell'ambito del PNRR – DM 118/2023 - CUP E14D23001900006
Objectives	Large-scale infrastructure systems such as transportation and energy networks are undergoing a technological revolution, due to the increasing penetration of renewables, availability of battery energy storage systems, pervasiveness of computation and communication devices, as well as the diffusion of the sharing economy, and the introduction of new kind of market players such as prosumers. These socio-technical systems are characterized by the complex interplay between the physical infrastructure, the cyber layer, and human factors (such as individuals, groups, organizations, and social structures). A central feature of such networked systems is the role that interconnections play in propagating and amplifying perturbations even if small or localized (systemic risk). This PhD fellowship will support fundamental research aimed at developing novel methodologies for the analysis and scalable design of such systems, with the goal of efficiently balancing performance, fairness, and resilience. The researcher will gain expertise on distributed control theory, game theory, optimization, networks, and learning and apply them to the study of infrastructure systems.
Skills and competencies for the development of the activity	Good knowledge of mathematical analysis, linear algebra, probability, and graph theory