Proposition de recherche doctorale

Technologies MIMO virtuelles pour les reseaux mesh robustes

Mots clés :

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- Unité de recherche : Laboratoire de recherche d'EURECOM
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- Domaine scientifique principal: Divers

Résumé du projet de recherche (Langue 1)

Thesis summary: Mesh networks (but also cellular and adhoc networks) can benefit greatly from coordination methods aiming at mitigating interference between simultaneous transmissions. For large scale and dense networks, the high level of inter-dependence between transmission strategies taken by the various nodes makes it difficult to converge toward a satisfactory equilibrium without a significant sharing of information between the nodes. At the core of this problem lies the problem of distributed decision making. As transmitters in the wireless networks can be considered as agents willing to cooperate, they can do so only at the price of information exchange mechanisms (i.e. exchange of channel state information, user data information etc.). In an ideal world, information exchange has zero cost and transmitters can make decisions (about the choice of various transmissions parameters such as beamforming direction, power level, frequency assignment, modulation and coding etc..) in a way that perfectly emulates a centralized optimization of the network, leading to optimal cooperation gains. In practice, information exchange is neither perfect nor free. Communication between nodes introduces latency, and is done at a finite rate, consuming spectral resources.

Résumé du projet de recherche (Langue 2)

In this framework, two fundamental questions arise: 1) how to find the right operational regime between a fully distributed decision making (not requiring information exchange but relying on local information only) and a fully centralized one, under specific exchange overhead constraints. 2) And what are the suitable information exchange mechanisms. Theoretical tools borrowed from learning theory, gossip theory, optimization theory, information theory and communication and signal processing will be exploited.