

ED STIC - Proposition de Sujets de Thèse pour la campagne d'Allocation de thèses 2015

Axe Sophi@Stic :

Titre du sujet :

Mention de thèse :

HDR Directeur de thèse inscrit à l'ED STIC :

Co-encadrant de thèse éventuel :

Nom :

Prénom :

Email :

Téléphone :

Email de contact pour ce sujet :

Laboratoire d'accueil :

Description du sujet :

Context :

With the increasing need of data rate, the telecommunication research community has provided a tremendous amount of new techniques. One of these is the so-called MIMO system, where MIMO stands for Multiple-Input Multiple-Output. In MIMO systems, both ends of a radio link are equipped with multiple antennas. The main benefit of this is the increase in capacity (roughly, if both ends hold N antennas, the capacity is N -folded, under good channel conditions) as well as the increased robustness (frequency-selective channels tend to become frequency- flat channels when a large number of antennas is used). Nevertheless, the design of MIMO systems is quite difficult. Indeed, the system must constantly adapt to the varying channel and is quite expensive,

both in terms of hardware/software and energy. These disadvantages can be alleviated by using very large MIMO systems (Massive MIMO).

Design of a modular Massive MIMO system :

Design of a Massive MIMO system with centralized processing can lead to high computing complexity as well

as costly analog hardware design. The objective of this thesis is to explore and develop a modular Massive MIMO

system, based on a collection of small antenna arrays (say 4/8 antennas). The challenges include the assessment

of the performance achievable with modular M-MIMO systems, the development of coordination/synchronisation algorithms and the specification of the hardware needed, both in terms

of (distributed) signal processing and of RF hardware.

[Larsson] "Massive MIMO for Next Generation Wireless Systems"

Erik G. Larsson, Fredrik Tufvesson, Ove Edfors and Thomas L. Marzetta,

<http://arxiv.org/abs/1304.6690>

[Shepard] ArgosV2: A Flexible Many-Antenna Research Platform

Clayton Shepard, Hang Yu, and Lin Zhong

[Bletsas] Bletsas, Aggelos, Andy Lippman, and John Sahalos. "Simple, zero-feedback, distributed beamforming with unsynchronized

carriers." IEEE Journal on Selected Areas in Communications 28

(2010):

URL : <http://www.gdr-isis.fr/news/2707/121/These-en-Massive-MIMO.html>

English version: