

REPORT UPDATE ON ACTIVITY WG 2

19th September 2014 - Palmela, Portugal

COLLABORATIONS WITHIN WG2

1) Lancaster University and University Institute of Lisbon
Dr. Francisco Monteiro visited Dr. Ioannis Chatzigeorgiou at Lancaster University for 1 month supported by an STSM grant by the COST Action IC1104.

2) Lancaster University and University of Novi Sad
Dr. Dejan Vukobratovic and Dr. Ioannis Chatzigeorgiou are collaborating and preparing a couple of technical contributions.

TESTBEDS

Jozef Stefan Institute, Ljubjana, Slovenia - Prof.

- Developing a practical test bed (WiFi router + few laptops) for Network Coding assisted retransmission scheme for multicast video streaming in WiFi network.

Istanbul Technical University, Turkey - Prof. Gunes Kurt

- We are working towards implementation of a random network coded OFDMA network with cross layer optimization. We have set-up hardware environment composed of 7 software defined radio nodes. We formulated system model and the associated optimization problem and started working on the simulation environment. The performance of the proposed system is investigated in terms of diversity-multiplexing tradeoff, and a conference paper is being prepared.

Project Team: Gunes Karabulut Kurt, Murat Uysal, Ibrahim Altunbas, Semiha tedik, Alireza Heidarpour, Bugra Engin

PUBLICATIONS

University Institute of Lisbon, Lisbon

- Flávio S. Brás, Filipe E. Ferreira, Francisco A. Monteiro and António Rodrigues, "Interference Suppression with Physical-Layer Network Coding and MIMO for Multi-Way Channels", SiPS 2014 - The IEEE International Workshop on Signal Processing Systems, Belfast, UK, Oct. 2014.

Pan-European University, Slovakia

- A manuscript for book for students under preparation. The title is Transcontrol Codes. It contains also Construction of Weighted Sum Codes over finite fields. (Acknowledgement to COST Action 1104 will be included) The deadline for submission to Wolters Kluwer is September 20-th.

University College Dublin

- Cristina Martínez and Alberto Besana, "Modeling languages from graph networks", accepted at proceedings of MDAI 2014, Tokyo.
- Cristina Martínez and Alberto Besana, "Modeling languages from mobile applications", accepted at proceedings of MDAI 2014, Tokyo.

Universitat Autònoma de Barcelona

- M. A. Vázquez-Castro, "Arithmetic Geometry of Compute and Forward", Information Theory Workshop, Hobart, Tasmania. November 2014.

SERVICE

University Institute of Lisbon - Prof. Francisco Monteiro

- Invited as Lead guest editor for the EURASIP Journal on Advances on Signal Processing for the special issue on Network Coding. (Issue to be published during 2015.).
- Co-organiser and chair of the session "Physical Layer Network Coding" at the 2014 European Signal Processing Conference (EUSIPCO 2014).

WORK IN PROGRESS

Universitat Politècnica de Barcelona - M. Isabel Garcia-Planas

- Roughly speaking, our work has been focusing on convolutional codes from the systems theory point of view. As we have been trying to study convolutional codes from that particular approach, in order to explore other functionalities of convolutional coding, we had to recall the relationship between both theories in some previous work, and also properties deriving from it. From there, we have been focusing mostly on decoding of convolutional codes, and later on, on constructing some quaternary convolutional codes. As we know, Convolutional Codes represent a type of error-correcting codes in which each k -bit information symbol (each k -bit string) to be encoded is transformed into an n -bit symbol, where $k \leq n$ is the code rate and the transformation is a function of the last information symbols contained in the memory of the physical encoder.
- Our work focuses on decoding convolution codes and its application to cyclic convolution codes

University College Dublin - Dr. Cristina Martínez

- 1. Codes, Horn's problem and Gromov-Witten invariants", joint with Alberto Besana,
Abstract: We study the Horn problem in the context of algebraic codes on a smooth projective curve defined over a finite field, reducing the problem to the representation theory of the special linear group $SL(2; \mathbb{F}_q)$. We characterize the coefficients that appear in the Kronecker product of symmetric functions in terms of Gromov-Witten invariants of the Hilbert scheme of points in the plane. In addition we classify all the algebraic codes defined over the rational normal curve.
- 2. Network coding, t -designs and the representation theory of $GL(n; \mathbb{F}_q)$ ", joint with Alberto Besana.