# Departamento de Matemáticas

# Decoding of 2D convolutional codes

In this talk we consider the decoding of two-dimensional (2D) convolutional codes. 2D convolutional have been a subject of interest in the last years and their algebraic properties and distance properties have been investigated by many authors (e.g. [1,2]). However very little is known about the decoding of these codes. In [3] the authors study the decoding of 2D convolutional codes over the erasure channel and present a decoding algorithm, but there is not known decoding algorithm when we consider the q-ary symmetric channels where errors can occur.

We propose a decoding algorithm for 2D convolutional codes by splitting the codewords of the code as polynomials with support in the parallel lines to the axis {a (1,0): a >=0} (or {a (0,1): a >=0}) and we propose several algorithms to correct the erasures situated in these lines. We also discuss the problem of decoding over a q-ary symmetric channel.

[1] E. Fornasini, M.E. Valcher. Algebraic aspects of two-dimensional convolutional codes, IEEE Transactions on Information Theory, 40, 1994, 1068-1082.

[2] J.J. Climent, D. Napp, C. Perea, R. Pinto. Maximum Distance Separable 2D Convolutional Codes. IEEE Transactions on Information Theory, 62(2), 2016, 669-680.

[3] J.J. Climent, D. Napp, R. Pinto, R. Simões: Decoding of 2D convolutional codes over the erasure channel. Advances in Mathematics of Communication, 10(1), 2016, 179-193

# Raquel Pinto
## Universidade de Aveiro, Portugal
### e-mail: raquel@ua.pt

**Fecha:**     27 de Junio, a las 13:00 horas.
**Lugar:**     Seminario de Matemáticas.

**Pequeña Biografía:** Raquel Pinto received the Degree in Applied Mathematics/Computer Science in 1991 from the University of Porto, the Master degree in Electronical Engineering from the University of Porto in 1995 and the Ph.D. in Mathematics from the University of Aveiro/ University of Padova (Italy) with the thesis "Matrix Fraction Descriptions in Convolutional Coding". She is now an Assistant Professor at the Department of Mathematics at the University of Aveiro. Her research interests are in the field of coding theory with particular interest on convolutional coding and systems theory, namely the behavioral approach to systems theory. She's got 29 publications according to Mathscinet.