

TEMPLE UNIVERSITY  
Department of Mathematics

# Applied Mathematics and Scientific Computing Seminar

Wednesday, 14 February 2018, 4:00 p.m.  
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

## On optimal feedback stabilization of a linear control system

by Nicola Guglielmi

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**Abstract.** We consider the problem of closed-loop stabilization by a feedback of minimal norm: Given a square matrix  $A$  that has some eigenvalues with positive real part, and rectangular matrices  $B$  and  $C$ , find the matrix  $K$  - if this exists - of minimal norm, such that  $A+BKC$  has no eigenvalue with positive real part. First we consider the simpler case where  $B = C = I$  (the identity) and study the classical minimal norm stabilization of a matrix, and then we shall explain the natural extension to linear control systems. We propose and study a novel approach to this non-convex and non-smooth spectral optimization problem, based on the solution of low-rank matrix differential equations. The method provides locally optimal solutions and performs well also on problems of high dimension. This is joint work with Christian Lubich (Univerität Tuebingen).