Nonlinear Compressive Sensing

Henrik Ohlsson

In many compressive sensing problems, the relationship between the measurements and the unknowns are nonlinear. Traditional treatment of such nonlinear relationships have been to approximate the nonlinearity via a linear model, and the subsequent un-modeled dynamics as noise. The ability to more accurately characterize nonlinear models has the potential to improve the results in both existing compressive sensing applications and those where a linear approximation does not suffice, e.g., phase retrieval. In this presentation, we discuss techniques and theories for nonlinear compressive sensing. In particular we show how to generalize basis pursuit to find the sparsest solution to nonlinear systems of equations, and discuss conditions for the uniqueness of the solution.