Homework Assignment - Module 2

Reading Assignment: Lecture Notes and Davenport *et al.*

Computer Assignment: Sparse Recovery via ℓ_0-minimization

1. **Recovery Challenge:** We have a signal $\mathbf{x}$ of 100 samples ($N = 100$) where no more than 3 of these samples are nonzero ($S \leq 3$). The location and magnitude of these nonzero samples are unknown. We have applied two different sensing matrices $\mathbf{A}$ on $\mathbf{x}$ and obtained two set of measurements $\mathbf{y} = \mathbf{A}\mathbf{x}$. The two sensing matrices $\mathbf{A}$'s as well as the two corresponding measurement vectors $\mathbf{y}$'s can be downloaded from Blackboard. Can you recover $\mathbf{x}$ by solving the classic ℓ_0-minimization problem? *Hint:* Matlab built-in function $nchoosek(1 : N, S)$ yields all subsets of S columns.

2. Do you have any observation on the sensing matrices and the two recovered signals $\mathbf{x}$?