?
?
?
?
k
0
$2k$
ℓ_1
?
ℓ_1
?
ell_1
?
ℓ_1
ω
s
$\alpha \in^n$
s
$\mathcal{O}(s \log n)$
?

$$y_i = \langle \alpha, \psi_i \rangle \quad (1)$$

$$y = \Psi \alpha \quad (2)$$

y_i
i^{th}
$\alpha \in^n$
ψ_i
i^{th}
y_i
Ψ
ψ_i
s
s
x_i

$$\alpha = \sum_{i=1}^{n} \phi_i x_i \quad (3)$$

$x \in$
$\alpha \in$
ϕ_i
n

$$\alpha = \Phi x \quad (4)$$

Σ_s
s
n

$$\Sigma_s = \{x \in^n : |\operatorname{supp}(x)| \leq s\} \quad (5)$$

$\operatorname{supp}(x)$
x
$s ensing_e xample.jpg A visualisation of the Compressive Sensing problem as an under-determined system$
x
$\alpha \in^n$
$A \in^{m \times n}$
$m \ll$
n

$$y = \Psi \alpha = \Psi \Phi x = Ax \quad (6)$$

A
A
Φ
Ψ
x
$m =$
n
x
x
A
A
s
$\delta \in$
$(0,1)$
$x \in$
Σ_s

$$(1-\delta) x_2^2 \leq A x_2^2 \leq (1+\delta) x_2^2 \quad (7)$$

A
s
n
A
??
$A^T A$
A
?
s
δ
$I, J \subset$
$[n]$
s
$u \in^n$

$$\langle A u_I, A u_J \rangle \leq \delta u_{I2} u_{J2} \quad (8)$$