

Ok, I will give a try. Suppose somehow we manage to know that the signal is made up of 15 columns of a dictionary matrix having 2000 columns in total. Then if we try to estimate  $x_0$  using brute force i.e. we have to go through all the possible cases and find the one that gives the lowest error or which is able to represent the signal perfectly. So the maths goes like this

Total no. of way to chose 15 columns out of 2000 :  ${}^{2000}C_{15} \approx 2.4 \times 10^{37}$

If each computation take 1 ns then the total time :

needed to go through all possible solutions will be :  $10^{-9} \times 2.4 \times 10^{37} = 2.4 \times 10^{28}$ second

which is equal to :  $\frac{2.4 \times 10^{28}}{(3600 \times 24 \times 365)} = 7.538 \times 10^{20}$  year

Thanks

# Bibliography