Compressive Sensing 2022
Claude Petit, Aline Roumy

Quiz & oral questions -1-

---

1. Given a block image x_{n_1,n_2}, with $n_1 \in \{0, ..., N_1 - 1\}$ and $n_2 \in \{0, ..., N_2 - 1\}$, what is the value of $c_{k_1=0,k_2=0}$?

   A. 1 (whatever the image block is).

   B. the average of the image block entries, up to a normalizing factor.

   C. the imaginary part of the image block entries

   D. the input block turned 90° counter clockwise

2. Consider an image that concatenates $c_{k_1=0,k_2=0}$ for each block. What does this image look like?

   A. the same image with a smaller spatial resolution

   B. the same image with a higher spatial resolution

   C. the downsampled image

3. Can 2D-DCT decomposition be put into a matrix*vector form such as $c = \Phi x$, where Φ is a matrix and x, c are vectors? and why?

   True

   False

4. What are the differences/similarities between the classical (sampling, then compression) approach and sparse approximation?

5. What is compressive sensing?

6. What is lossless and lossy compression?

7. Is it possible to perfectly reconstruct a continuous signal from a discrete sample of few measurements? If so, how?

8. What happens if we undersample a signal?

9. What are the applications of sparse representations and compressive sensing?

10. Which of the following statements are correct?

    A. Σ_k is a union of subspaces of dimension s

    B. Σ_k is a union of subspaces of different dimensions

    C. Σ_k is a subspace of dimension s