Assignment 7: **Beamforming and sound localization**

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1 Aim

1. **Understanding Delay-And-Sum Algorithm (DAS)** : write code for reconstructing an image using the DAS algorithm that is commonly used in Ultrasound image reconstruction
2. **Reconstructing the mic outputs**: Reconstructing what the mic outputs will look like if the location of the obstacle is known.

2 How to run the program

1. **ENSURE THAT BOTH TEXT FILES EXIST AND ARE IN THE SAME FOLDER / LOCATION AS THE NOTEBOOK.**
2. To change the parameters of first part, change the parameters in the first cell after the heading.
3. To change the parameters of second part, change the parameters in the first cell after the heading.
4. Just run the ipynb file in order from top to bottom to reproduce the results.

3 Results:

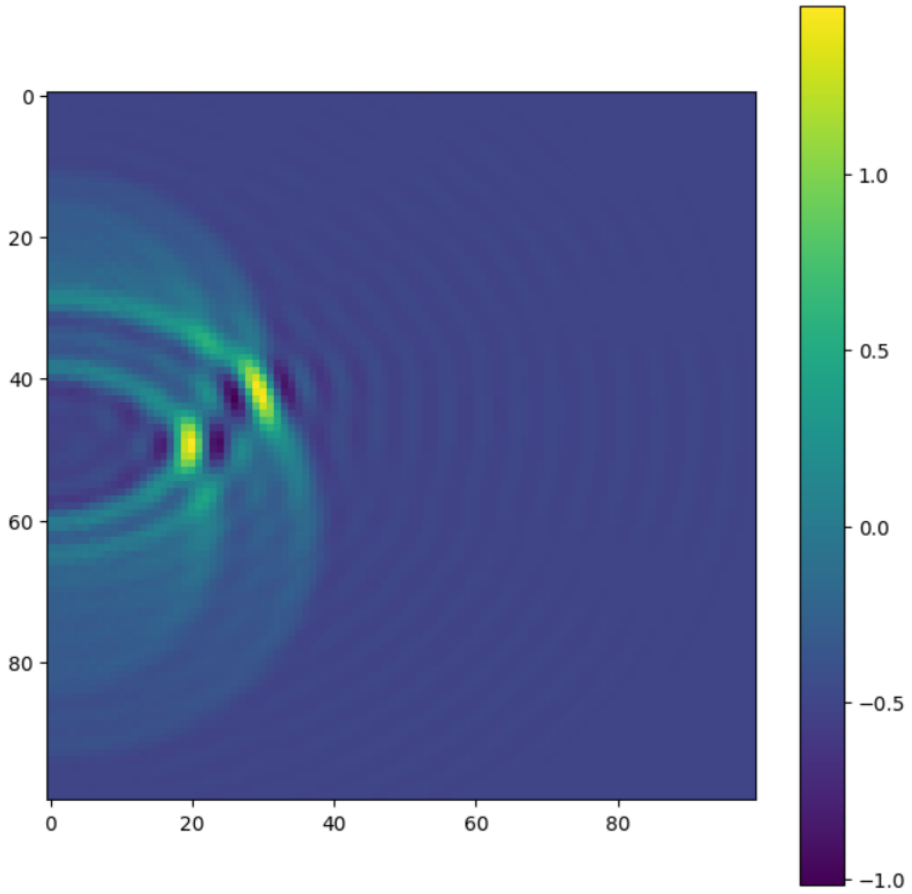

Figure 1: results for rx2.txt

It can be seen in the image that the obstacles are somewhere near (20, 48) and (30, 40) which corresponds to (2, 0.2) and (3, -1) respectively.

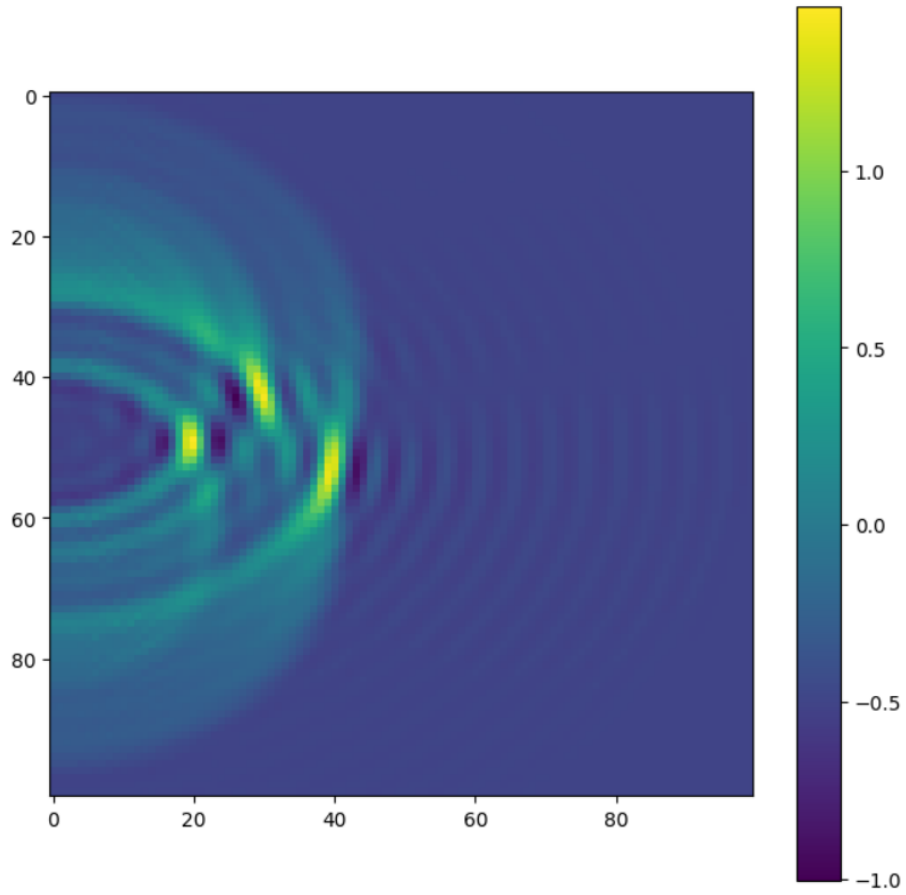

Figure 2: results for rx3.txt

It can be seen in the image that the obstacles are somewhere near (20, 50), (30, 40) and (40, 55) which corresponds to (2, 0), (3, -1) and (4, 0.5) respectively.

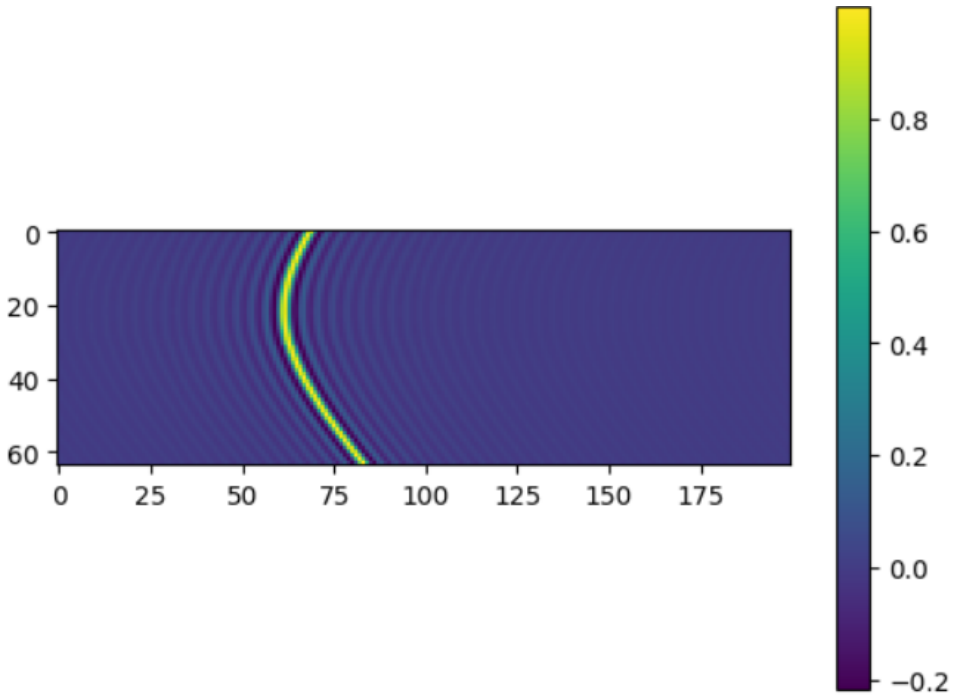

Figure 3: mic output for obstacle at (3, -1)

4 Last Question results

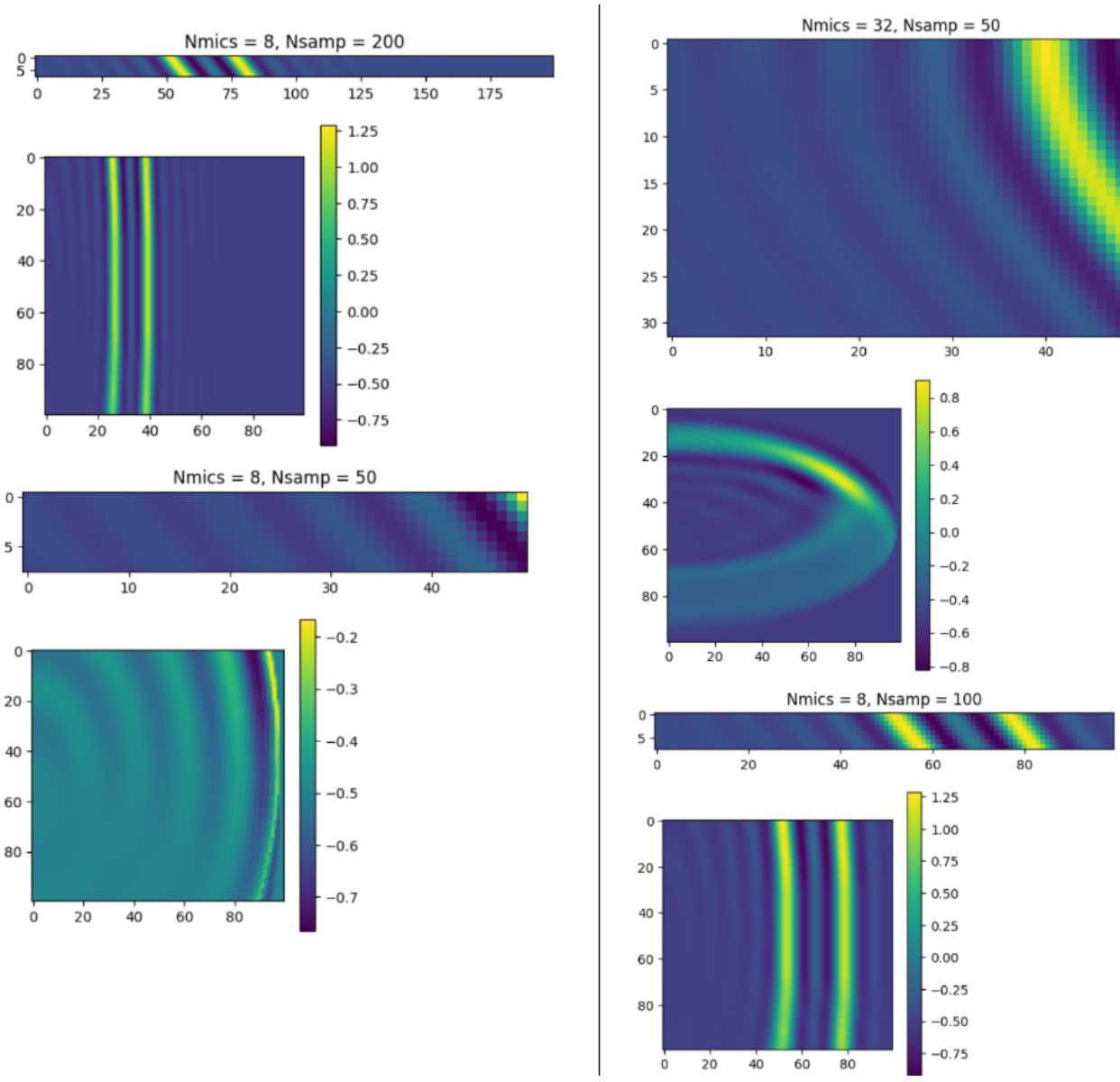

Figure 4:

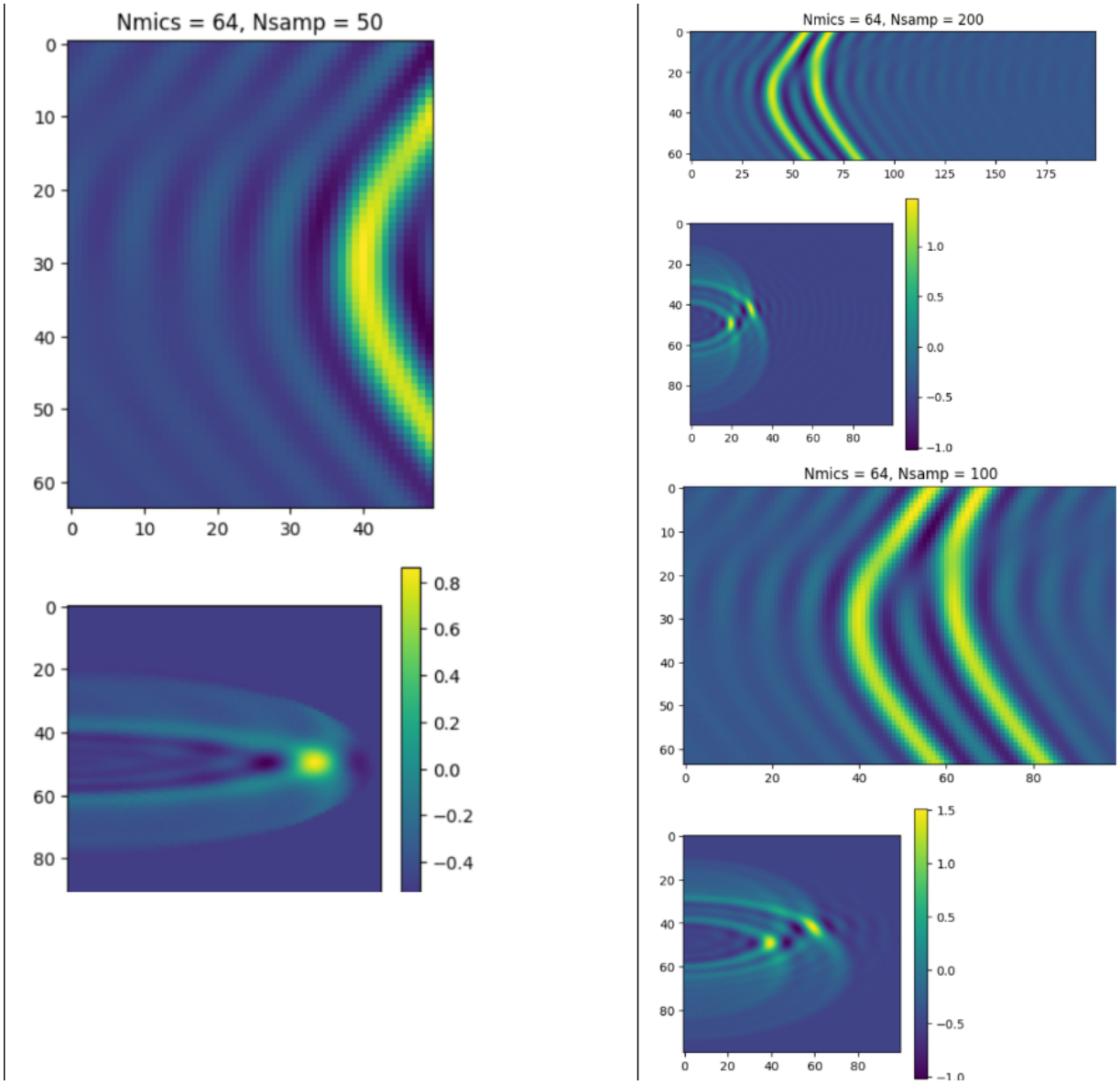

Figure 5:

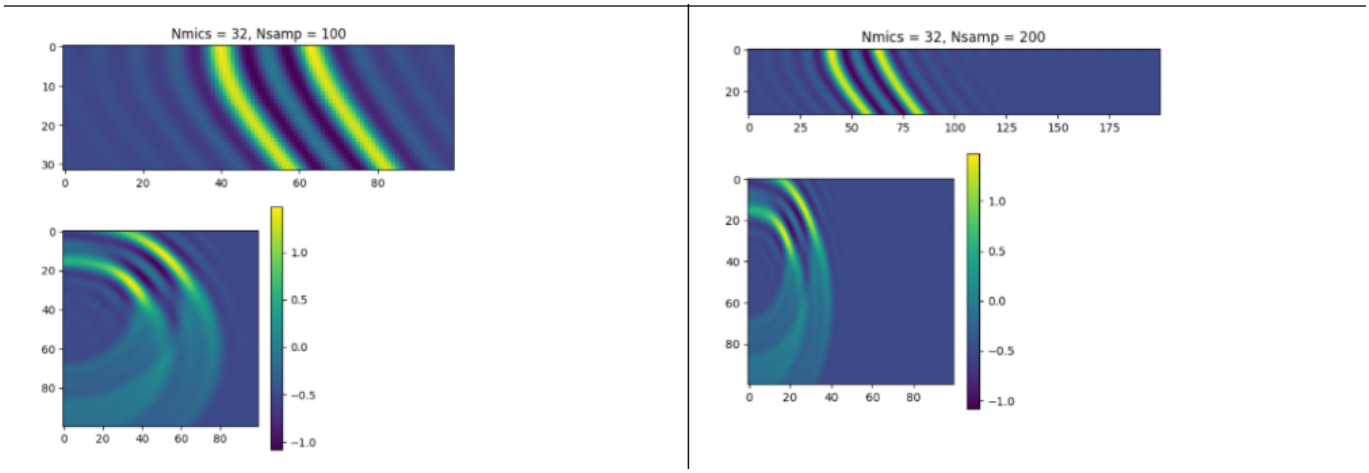

Figure 6:

Thank you