Digital Signal Processing, Fall 06
Laboratory Project 3: Three Dimensional Acoustic Processing
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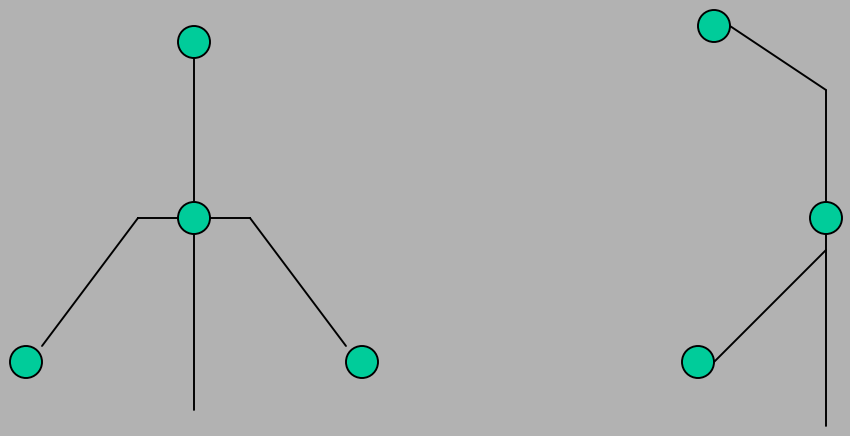

Figure: Four Element Microphone Array

Assignment:

1. Take measurements of the array elements, and calibrate the array for a single sound source (meaning, adjust the delays so that the sound adds in phase).
2. Take measurements of the sound source at particular locations using the Quick filter usb 4 channel system in the laboratory
3. In matlab, simulate the beam pattern.
    1. You could create a list of {x,y,z,amp} of different positions
    2. Select the points which are of similar amplitude (- eps < amp-threshold < eps)
    3. Plot the surface.
4. Alternatively you could measure the response for a fixed radius, and create a mesh of the amplitudes.
5. Provide a complete write-up of the experimental setup. Including sources of errors, and suggestions for improvement of the array of microphones

References:

- The Inverse Problem: http://www.meyersound.com/support/papers/steering/
- General Background: http://casa.colorado.edu/~danforth/science/sonar/sonar1.html
- UTAMS: (The array is on the top of the building) http://www.rdecom.army.mil/rdemagazine/200506/part_agi.html https://peoiewswebinfo.monmouth.army.mil/portal_sites/IEWS_Public/RUS/UTAMS.htm