

**EN-74 ECE: Introduction to Image Processing**  
**Tufts University**  
**Fall 2007**  
**Problem Set 5**  
**Due October 11, 2007**

**READING: McAndrew Chapter 5**

1. Convolve by hand the signals  $x[n] = \{\underline{1}, 2, 3, 4\}$  and  $h[n] = \{-1, \underline{2}, 1\}$
2. Convolve by hand the signals

$$x[n] = \begin{cases} n & n = 0, 1, 2, 3, \dots \\ 0 & \text{else} \end{cases} \quad \text{and} \quad h[n] = \{\underline{-1}, 1\}$$

- Explain how/why we can think of  $h$  as a discrete form of a differentiator?
3. Figure out how to use the `conv` function in Matlab to convolve two 1D signals. Note that `conv` does not keep track of the index set of the output signal. How can you do this if you know the index sets of  $x$  and  $h$ ? Verify the correctness of the first problem.