MATH 2025 Fall 2009

Assignment 1

Due Thursday, September 10, before the class

For full credit, show all your work!

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1. Plot and write a formula for the step function $\tilde{q}$ corresponding to the sample in the following table 5 pts

j	0	1	2	3	4	5	6	7
r_j	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
s_j	7	5	2	2	0	2	5	1

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2. Calculate the *ordered Fast Haar Wavelet Transform* for the data $\mathbf{s} = (7, 5, 2, 2, 0, 2, 5, 1)$. 9 pts

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3. Write the results in the **first** and **second** step in problem 2 as a combination of the functions ϕ and ψ. 7 pts

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4. Assume that the *ordered Haar Wavelet Transform* of a sample $\mathbf{s} = (s_0, s_1, s_2, s_3)$ produces the results $\mathbf{a}^{(2-2)} = (6)$, $\mathbf{c}^{(2-2)} = (1)$, and $\mathbf{c}^{(2-1)} = (2, 2)$. 9 pts

(a) Explain how $a_0^{(2-2)} = 6$ relates to the sample;
(b) Explain how $c_0^{(2-2)} = 1$ relates to the sample;
(c) Explain how $c_0^{(2-1)} = 2$ relates to the sample.
