Exercise 2: The Haar Wavelet Basis

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Exercise 2: Cranking The Machine

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Exercise 2: Cranking The Machine
# define a test vector
level = 3
s = np.matrix(((1.0, 2.0, 3.0, -1.0, 1.0, -4.0, -2.0, 4.0), dtype=float)).transpose()

# compare the normalized transformation computed using the matrix and the pyramidal algorithm
normalized = True
A = buildHaarWaveletTransformationMatrix(level, normalized=normalized, inverse=False)
A_inv = buildHaarWaveletTransformationMatrix(level, normalized=normalized, inverse=True)

print(A)
print(A_inv)
v_mat = A_inv * s
print("result from (normalized) matrix application:", v_mat.transpose())

v_trafo = applyHaarWaveletTransform(s, level, normalized=normalized, inverse=False)
print("result from application of pyramidal algorithm:", v_trafo.transpose())
print("result from composite application of inv. pyramidal algorithm:", applyHaarWaveletTransform(v_trafo, level, normalized=normalized, inverse=True).transpose())

[[ 0.35355339  0.35355339  0.5         0.          0.70710678  0.          0.        
  0.35355339  0.35355339  0.5         0.         -0.70710678  0.          0.        
  0.35355339  0.35355339 -0.5         0.          0.          0.70710678  0.          0.        
  0.35355339  0.35355339 -0.5         0.          0.         -0.70710678  0.          0.        
  0.35355339 -0.35355339  0.          0.5         0.          0.70710678  0.          0.        
  0.35355339 -0.35355339  0.          0.5         0.          0.-0.70710678  0.          0.        
  0.35355339 -0.35355339  0.         -0.5         0.          0.          0.70710678  0.          0.        
  0.35355339 -0.35355339  0.         -0.5         0.          0.          0.-0.70710678]]

[[ 1.41421356  2.12132034  0.5        -2.5        -0.70710678  2.82842712  3.53553391 -4.24264069]]

[[ 1.41421356  2.12132034  0.5        -2.5        -0.70710678  2.82842712  3.53553391 -4.24264069]]

[[ 1.  2.  3. -1.  1. -4. -2.  4.]]