Lab 5
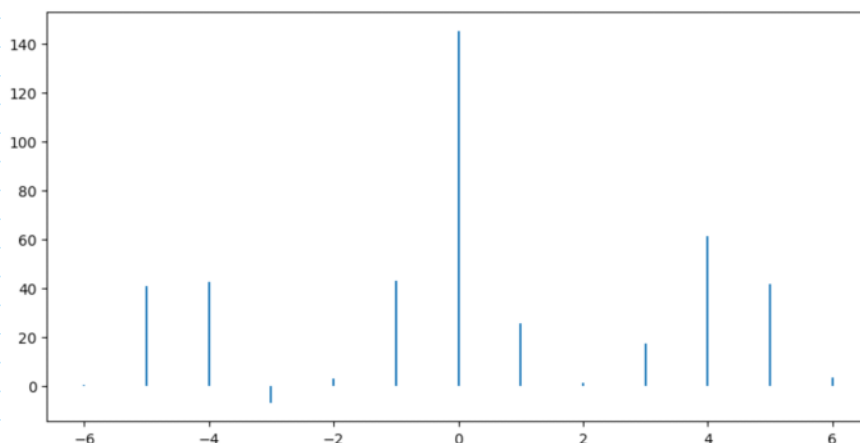
Sunday, January 8, 2023   11:36 AM

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1. Lab 5.1
   - x(k) = [1, 11, 2, 0, -1, 4, 4]
   - y(k) = x(k - 0) + w(k)
   - Cross-correlation of x and y:
     [8.75763229, 43.03830966, 40.27023148, -1.28610915, -5.14675465, 55.44873997, 130.74515059, 33.42888686, -5.69940437, -8.04147059, 58.94848556, 27.03898246, 1.99020033]
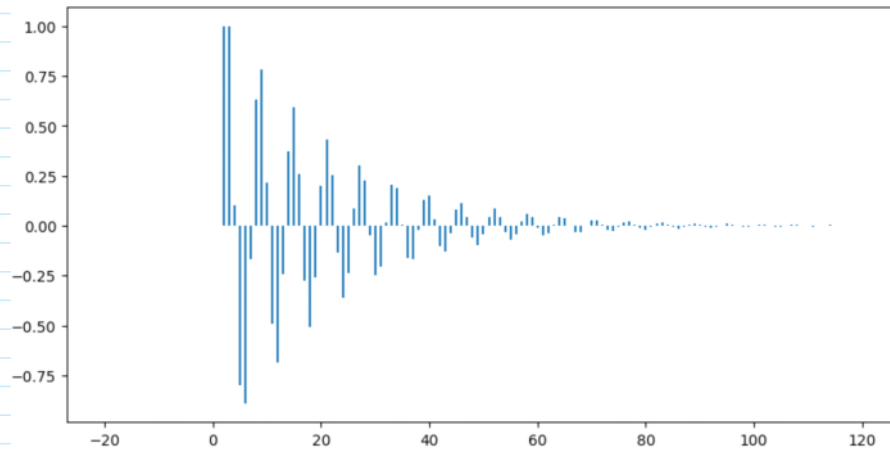   - Plot:

2. Lab 5.2
   - y(k) - y(k - 1) + 0.9y(k - 2) = x(k)
   - g(k) =
     [0.00000000e+00, 0.00000000e+00, 0.00000000e+00, 0.00000000e+00,
       0.00000000e+00, 0.00000000e+00, 0.00000000e+00, 0.00000000e+00,
       0.00000000e+00, 0.00000000e+00, 0.00000000e+00, 0.00000000e+00,
       0.00000000e+00, 0.00000000e+00, 0.00000000e+00, 0.00000000e+00,
       0.00000000e+00, 0.00000000e+00, 0.00000000e+00, 0.00000000e+00,
       0.00000000e+00, 0.00000000e+00, 1.00000000e+00, 1.00000000e+00,
       1.00000000e-01, -8.00000000e-01, -8.90000000e-01, -1.70000000e-01,
       6.31000000e-01, 7.84000000e-01, 2.16100000e-01, -4.89500000e-01,
       -6.83990000e-01, -2.43440000e-01, 3.72151000e-01, 5.91247000e-01,
       2.56311100e-01, -2.75811200e-01, -5.06491190e-01, -2.58261110e-01,
       1.97580961e-01, 4.30015960e-01, 2.52193095e-01, -1.34821269e-01,
       -3.61795054e-01, -2.40455912e-01, 8.51596366e-02, 3.01569958e-01,
       2.24926285e-01, -4.64866771e-02, -2.48920334e-01, -2.07082324e-01,
       1.69459761e-02, 2.03320068e-01, 1.88068689e-01, 5.08062832e-03,
       -1.64181192e-01, -1.68753758e-01, -2.09906847e-02, 1.30887697e-01,
       1.49779313e-01, 3.19803859e-02, -1.02820996e-01, -1.31603343e-01,
       -3.90644469e-02, 7.93785621e-02, 1.14536564e-01, 4.30958585e-02,
       -5.99870495e-02, -9.87733221e-02, -4.47849776e-02, 4.41110123e-02,
       8.44174921e-02, 4.47175810e-02, -3.12581619e-02, -7.15039848e-02,
       -4.33716391e-02, 2.09819472e-02, 6.00164224e-02, 4.11326699e-02,
       -1.28821102e-02, -4.99015132e-02, -3.83076140e-02, 6.60374790e-03,
       4.10806005e-02, 3.51372274e-02, -1.83531306e-03, -3.34588177e-02,
       -3.18070359e-02, -1.69410001e-03, 2.69322323e-02, 2.84569223e-02,
       4.21791324e-03, -2.13933169e-02, -2.51894388e-02, -5.93545360e-03,
       1.67350413e-02, 2.20769495e-02, 7.01541237e-03, -1.28538422e-02,
       -1.91677133e-02, -7.59925536e-03, 9.65168665e-03, 1.64910165e-02,
       7.80449849e-03, -7.03741634e-03, -1.40614650e-02, -7.72779027e-03,
       4.92752821e-03, 1.18825395e-02, 7.44776407e-03, -3.24652144e-03,
       -9.94950910e-03, -7.02763980e-03, 1.92691839e-03, 8.25179421e-03,
       6.51756766e-03, -9.09047128e-04, -6.77485802e-03, -5.95671561e-03,
       1.40656613e-04, 5.50170066e-03, 5.37510971e-03, 4.23579114e-04,
       -4.41401962e-03, -4.79524083e-03, -8.22623165e-04, 3.49309358e-03,
       4.23345443e-03, 1.08967021e-03, -2.72043878e-03, -3.70114196e-03,
       -1.25274706e-03, 2.07828070e-03, 3.20575306e-03, 1.33530043e-03,

-1.54987733e-03, -2.75164771e-03, -1.35675812e-03, 1.11972482e-03,
2.34080713e-03]

○ Plot of g(k)

○ The system specified by g(k) is stable