Math508 Homework 8

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Abstract

Parameter estimation as a filtering problem

1 Part a

```
Xn_list
[3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3]
Wn_list
[-1, -1, -1, -1, -1, -1, -1, 1, -1, 1]
Yn_list
[0, -2, -8, -26, -80, -242, -728, -2186, -6556, -19670, -59008]
pi_array
[[ 0.16666667  0.16666667  0.16666667  0.16666667  0.16666667  0.16666667]
 [ 0.16666667  0.16666667  0.16666667  0.16666667  0.16666667  0.16666667]
 [ 0.          0.          0.          0.5         0.          0.5        ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.         ]
 [ 0.          0.          0.          1.          0.          0.        ]]
```

2 Part b

```
Xn_list
[2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2]
Wn_list
[1.9446051120414123, -0.13824914174573419, -1.5748575775316218, -0.54871451009012018,
-0.45185791258366126, 1.5723420272934401, 1.2558999008900584, -0.8665661059385612,
0.12354094203505696, 0.30071284018698508]
Yn_list
[0, 1.9446051120414123, 3.7509610823370902, 5.9270645871425582, 11.305414664194997,
 22.158971415806331, 45.890284858906099, 93.036469618702256, 185.20637313146594,
 370.53628720496692, 741.37328725012082]
pi_array
[[  1.66666667e-001   1.66666667e-001   1.66666667e-001   1.66666667e-001
```

```
             1.66666667e-001   1.66666667e-001]
 [  1.66666667e-001   1.66666667e-001   1.66666667e-001   1.66666667e-001
    1.66666667e-001   1.66666667e-001]
 [  6.76592938e-004   1.50311246e-001   7.60984240e-001   8.77970709e-002
    2.30836546e-004   1.38308631e-008]
 [  6.79497031e-011   6.01132082e-002   9.39886532e-001   2.59719240e-007
    1.26839931e-021   1.09479058e-043]
 [  1.48041094e-038   3.88984833e-008   9.99999961e-001   2.51526781e-016
    6.18992546e-055   1.49040239e-116]
 [  3.90011245e-145   1.13341844e-033   1.00000000e+000   2.67859038e-046
    2.17825735e-170   0.00000000e+000]
 [  0.00000000e+000   1.99198263e-155   1.00000000e+000   8.62438942e-138
    0.00000000e+000   0.00000000e+000]
 [  0.00000000e+000   0.00000000e+000   1.00000000e+000   0.00000000e+000
    0.00000000e+000   0.00000000e+000]
 [  0.00000000e+000   0.00000000e+000   1.00000000e+000   0.00000000e+000
    0.00000000e+000   0.00000000e+000]
 [  0.00000000e+000   0.00000000e+000   1.00000000e+000   0.00000000e+000
    0.00000000e+000   0.00000000e+000]
 [  0.00000000e+000   0.00000000e+000   1.00000000e+000   0.00000000e+000
    0.00000000e+000   0.00000000e+000]]
```