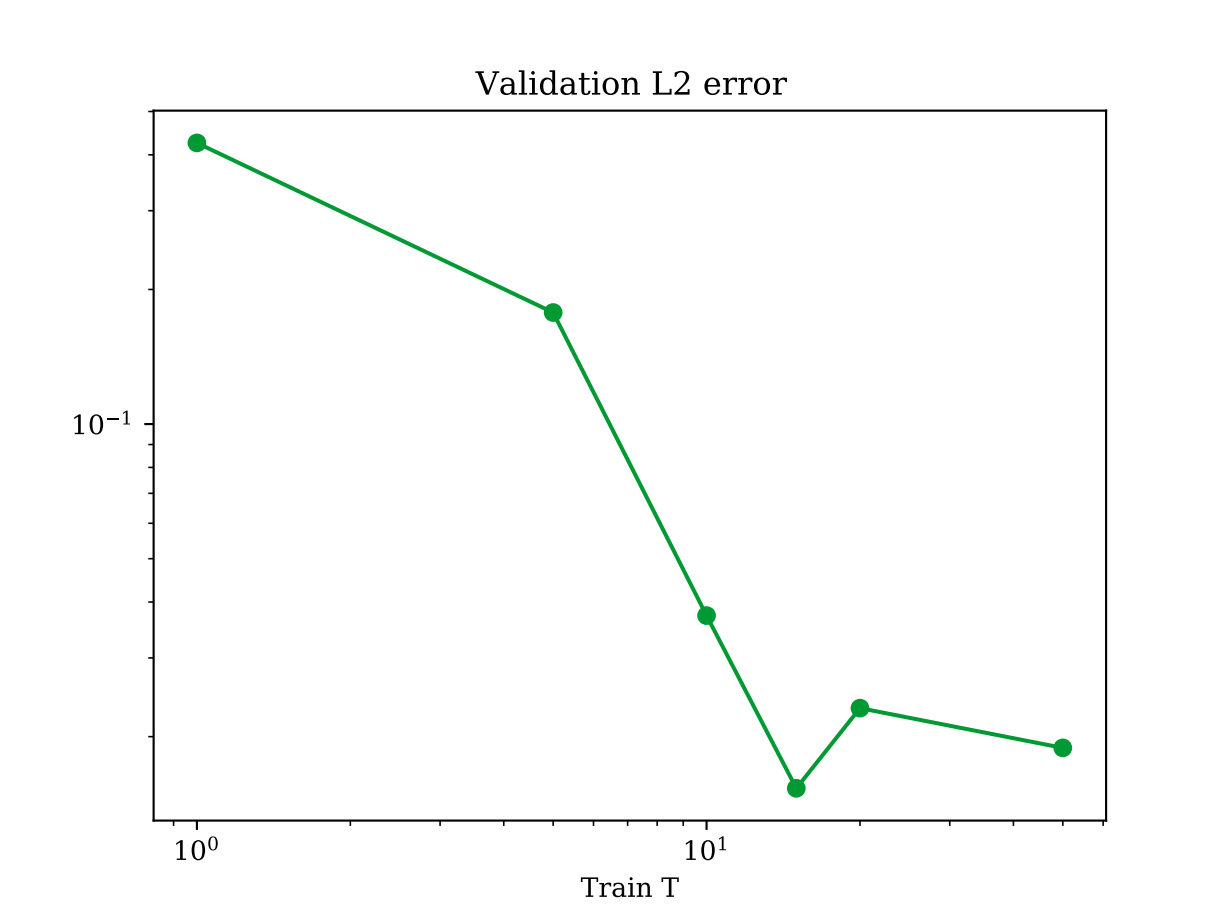
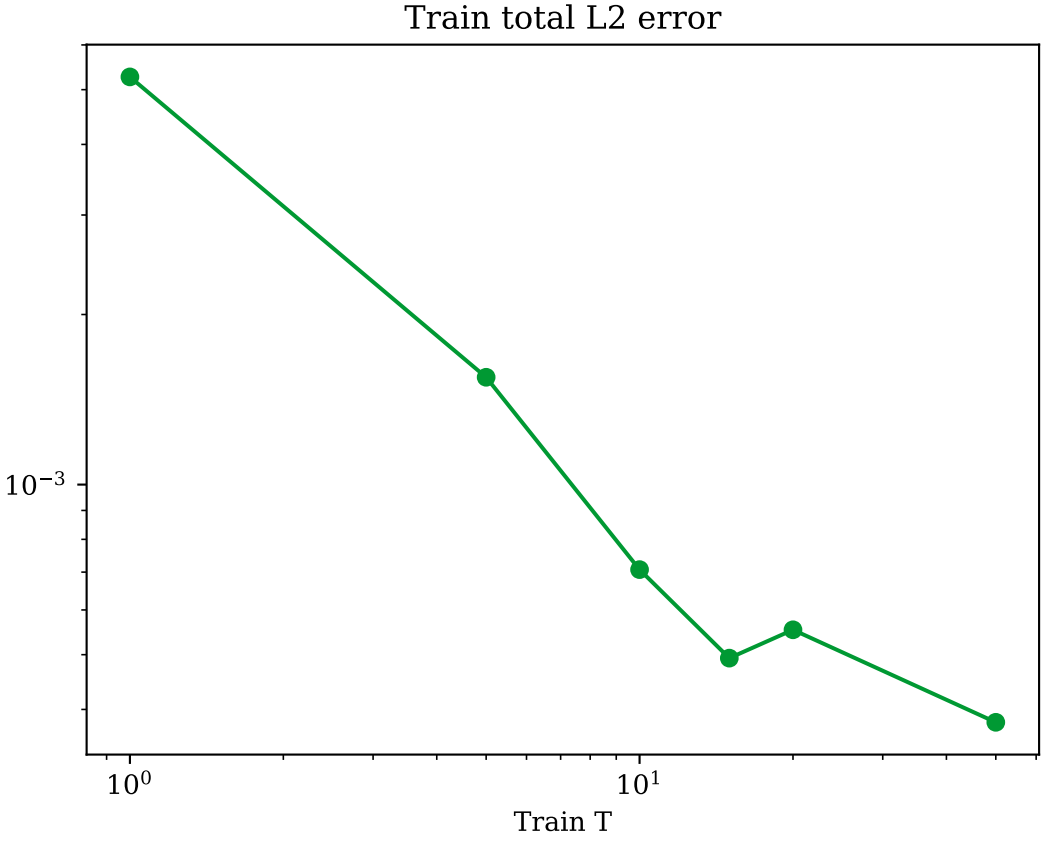
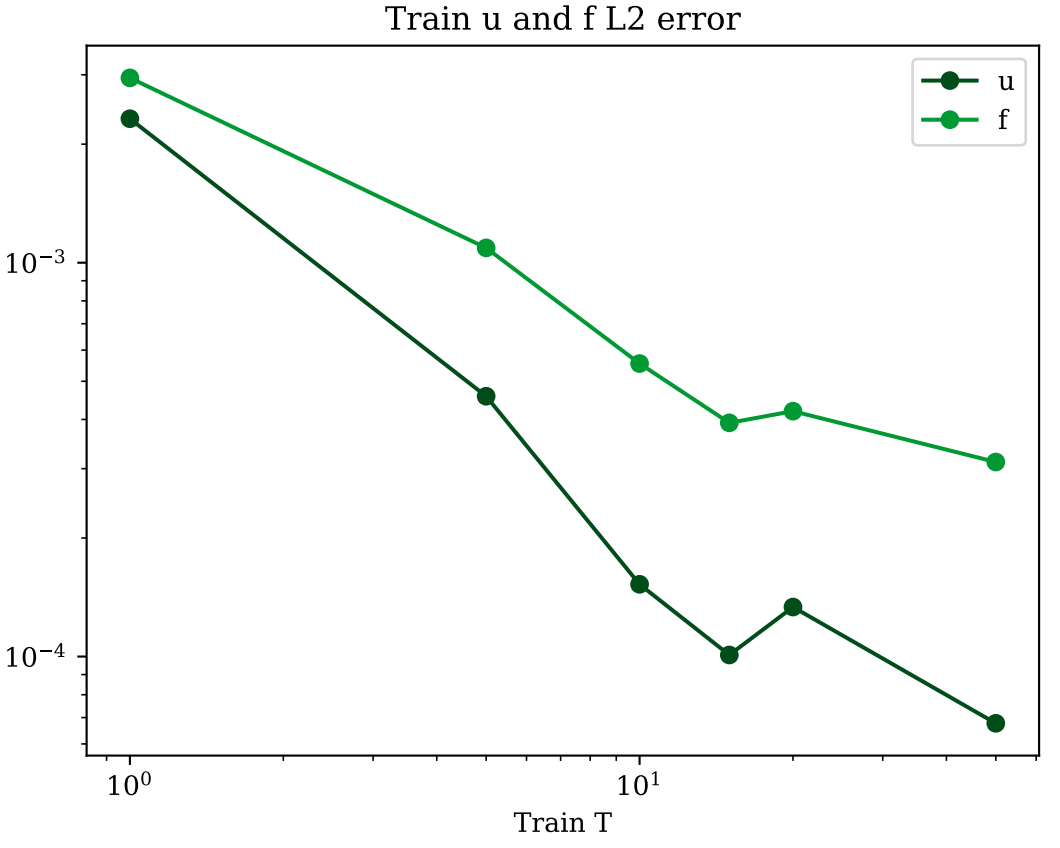
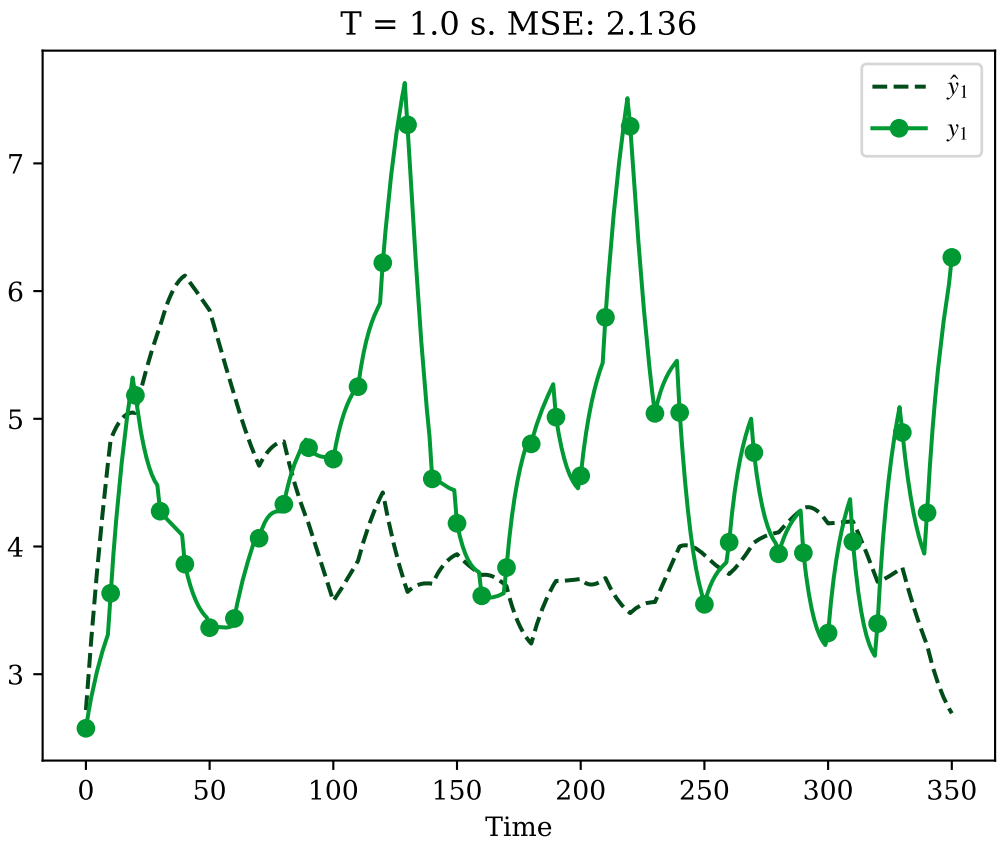
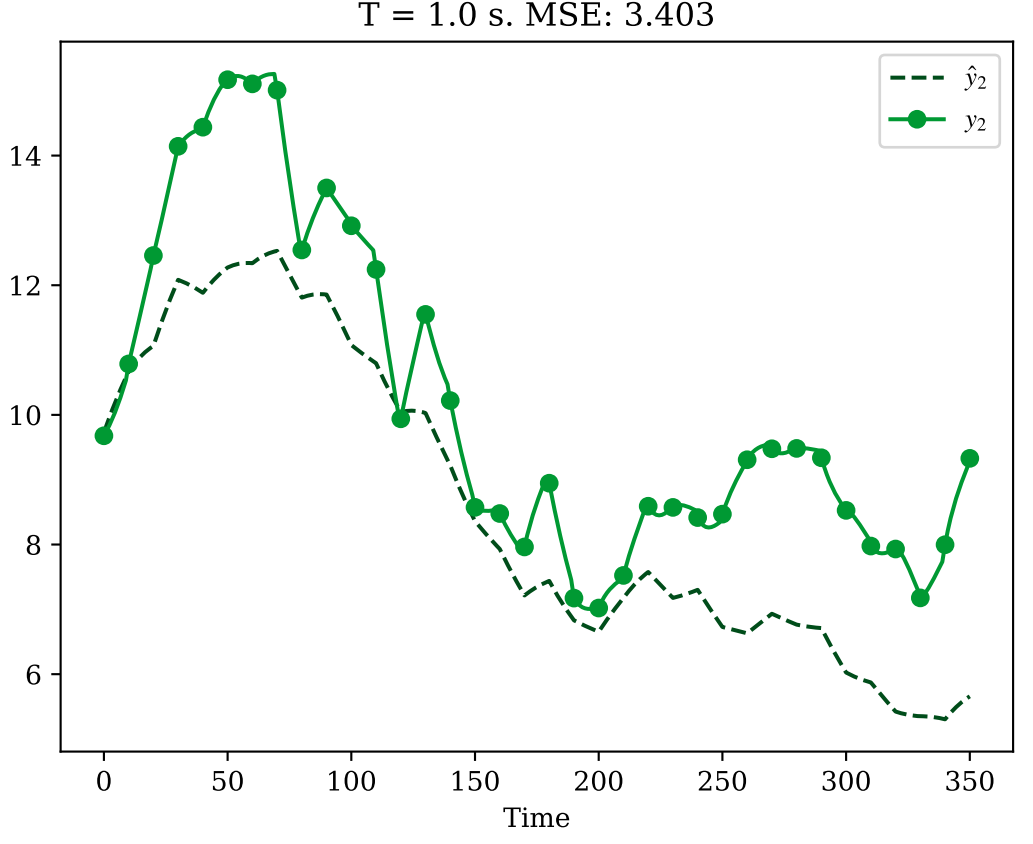
Neural network's T test:
Test duration -> 1 day, 6:34:58.872724
Adam epochs -> 500
Max L-BFGS iterations -> 2000
Neural network's structure -> 5 hidden layers of 20 neurons
Train Nu -> 1000
Train Nf -> 100000
Validation points -> 3160
Validation T -> 10.0 s
Test points -> 316
Test T -> 10.0 s

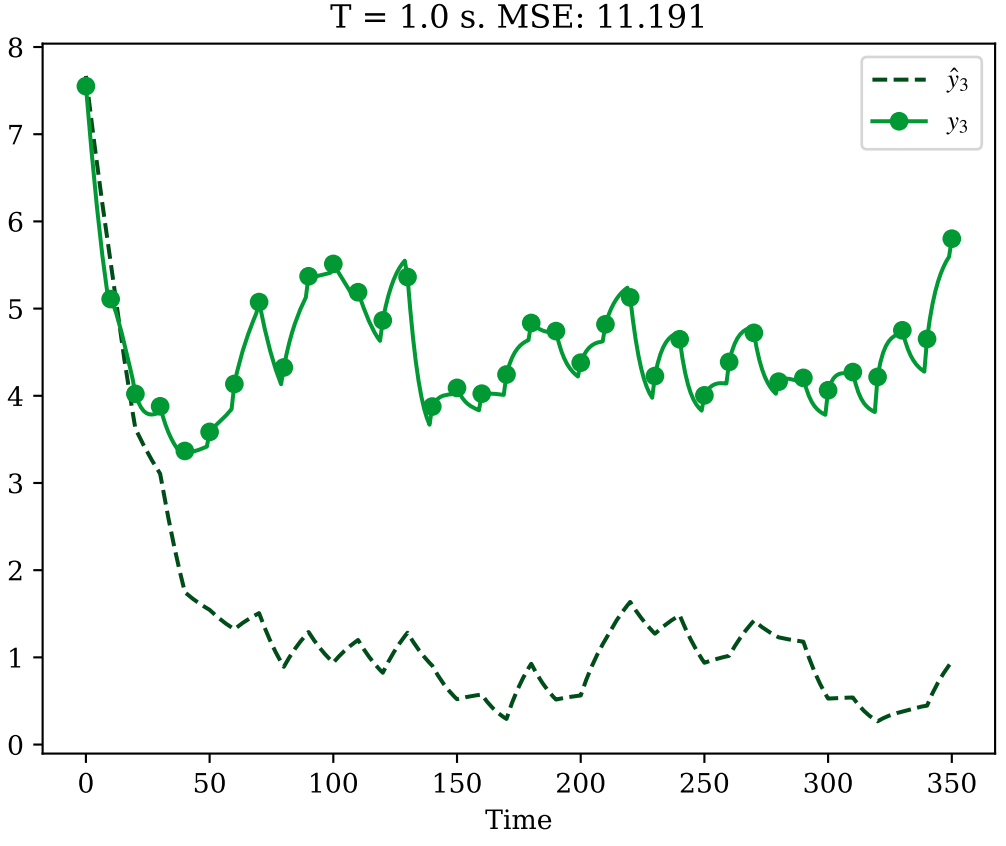

Validation L2 error
10^{-1}
10^{0}
10^{1}
Train T

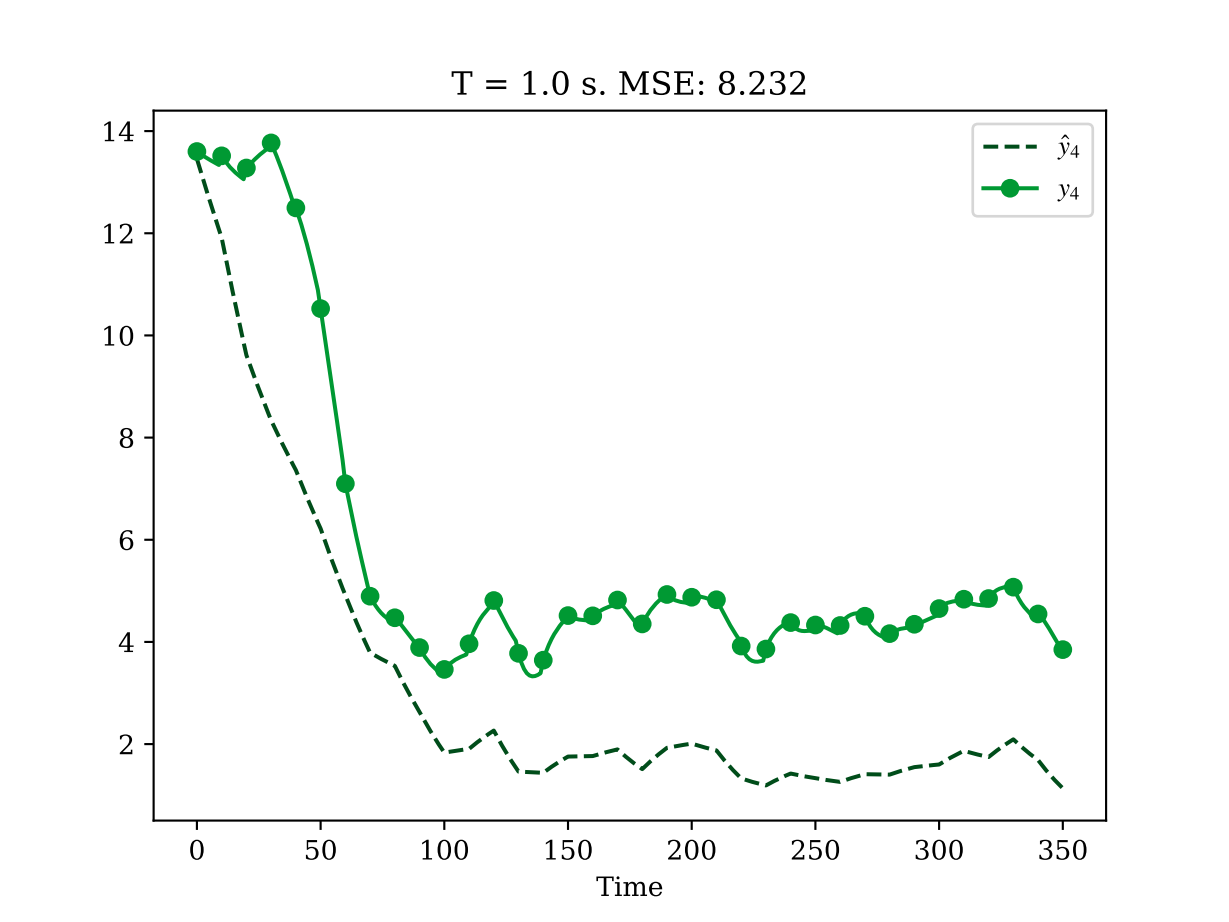

Train total L2 error
10^{-3}
10^{0}
10^{1}
Train T

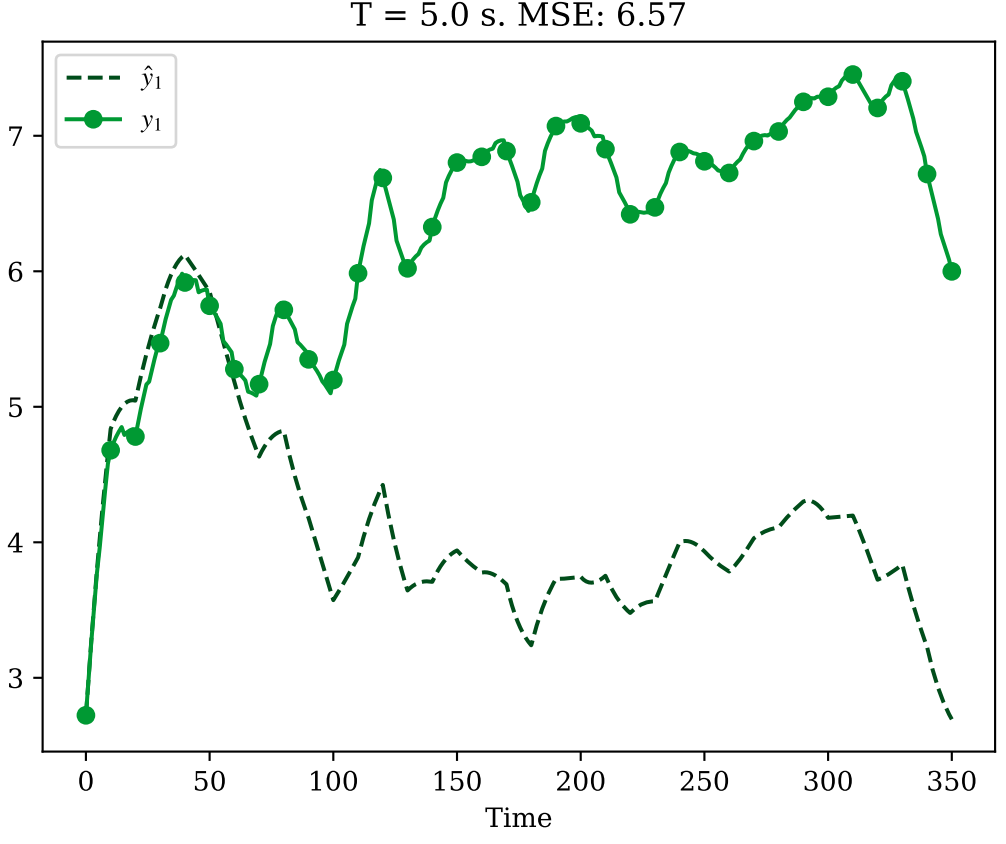

Train u and f L2 error
u
f
10^{-3}
10^{-4}
10^{0}
10^{1}
Train T

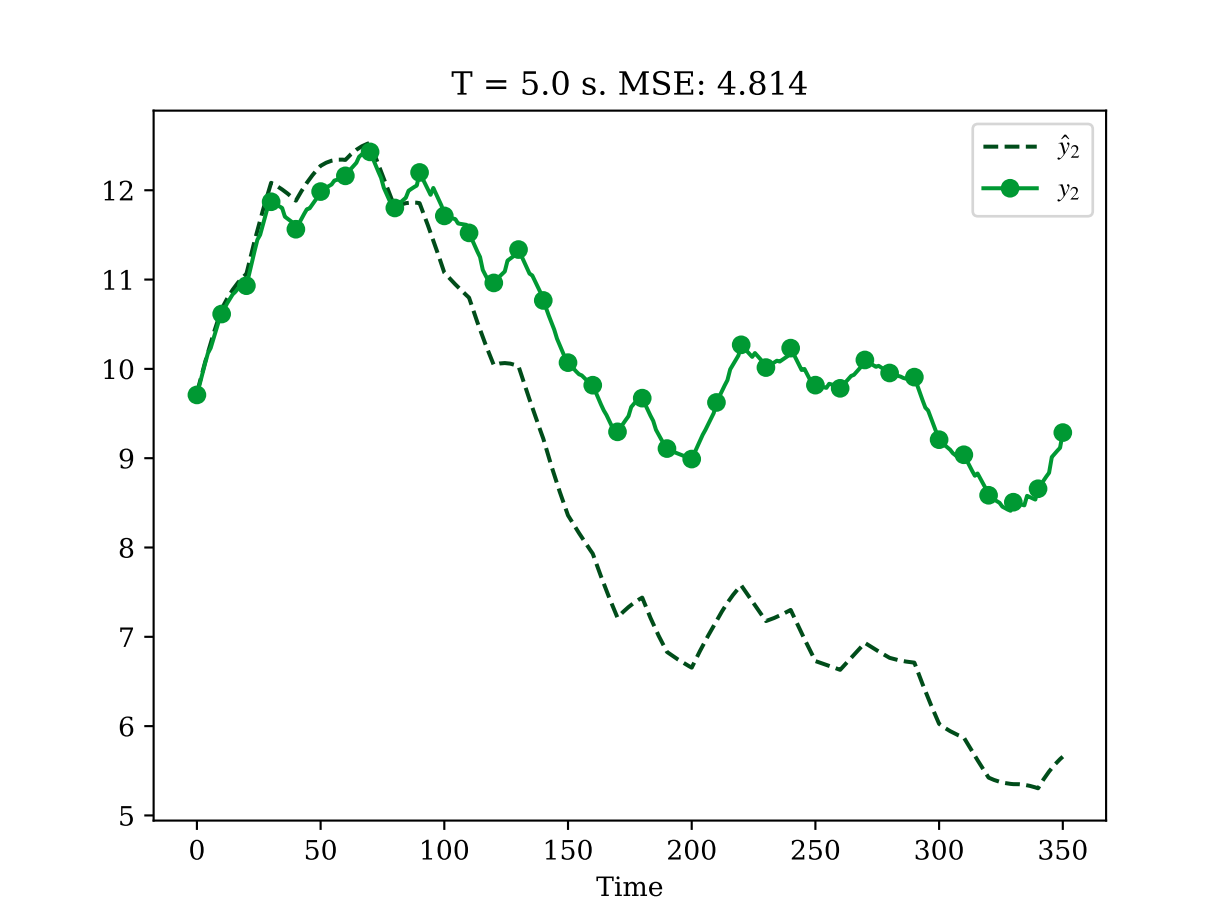

T = 1.0 s. MSE: 2.136
$\hat{y}_1$
y_1
7
6
5
4
3
0
50
100
150
200
250
300
350
Time

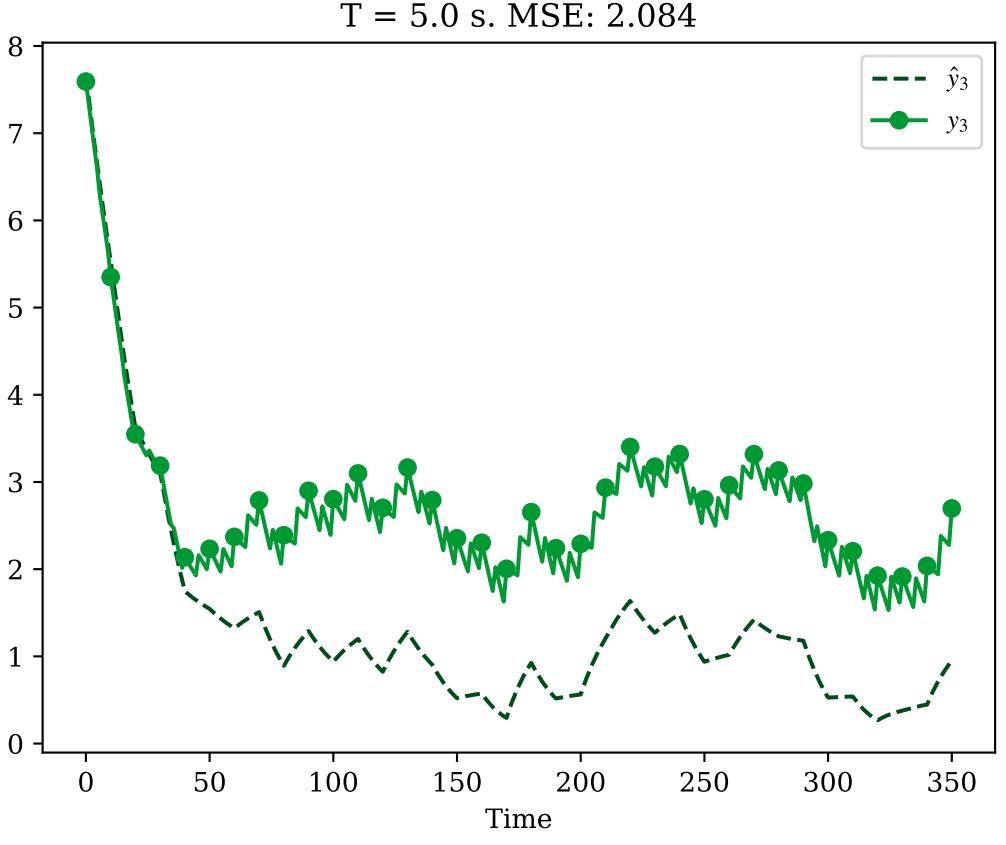

T = 1.0 s. MSE: 3.403
$\hat{y}_2$
y_2
14
12
10
8
6
0
50
100
150
200
250
300
350
Time

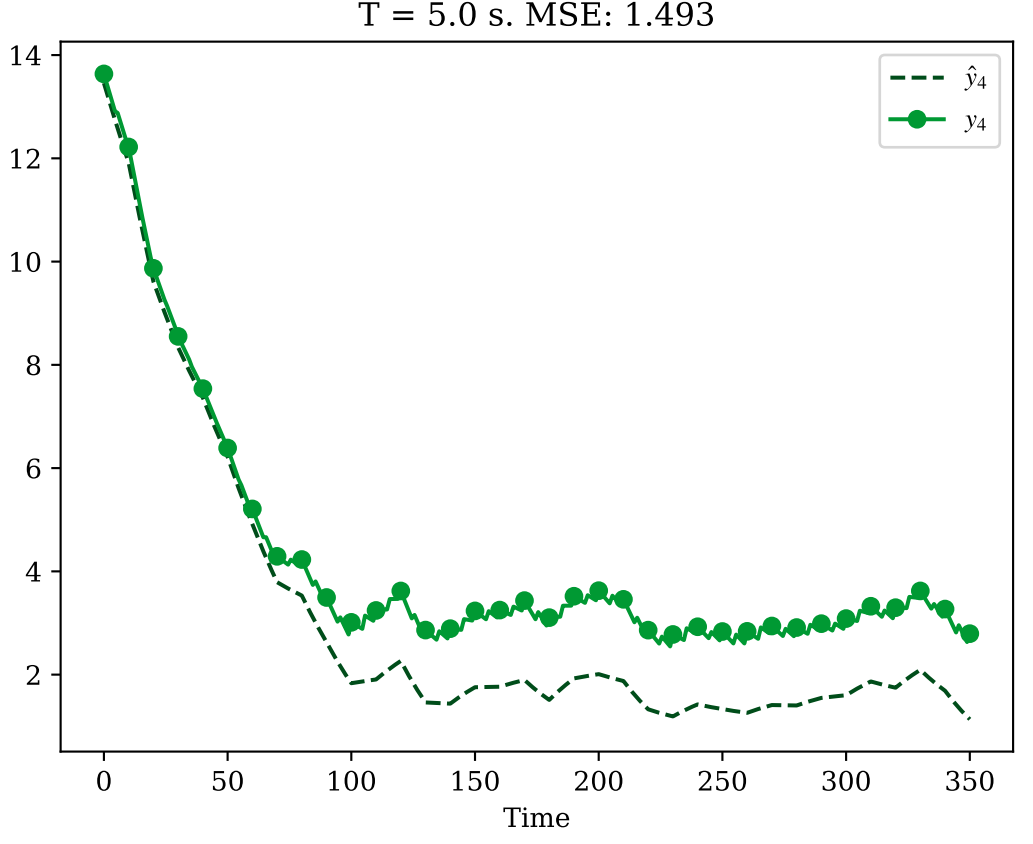

T = 1.0 s. MSE: 11.191
$\hat{y}_3$
y_3
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300
350
Time

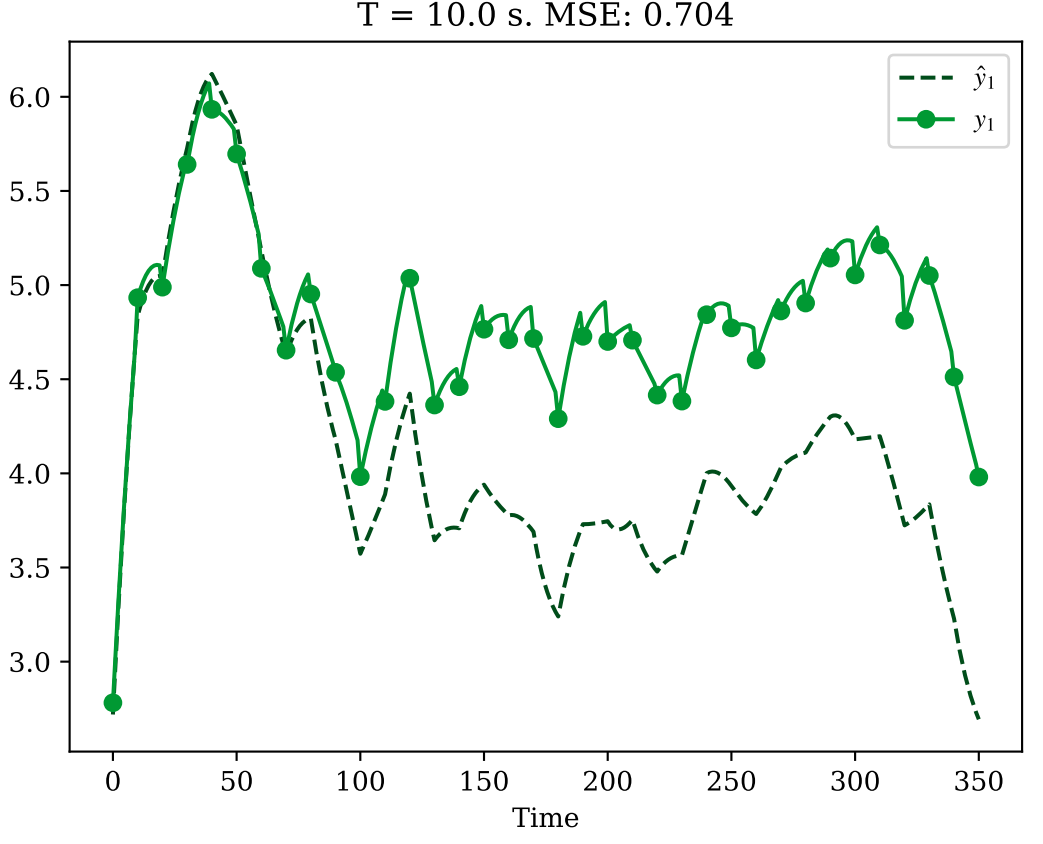

T = 1.0 s. MSE: 8.232
$\hat{y}_4$
y_4
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time

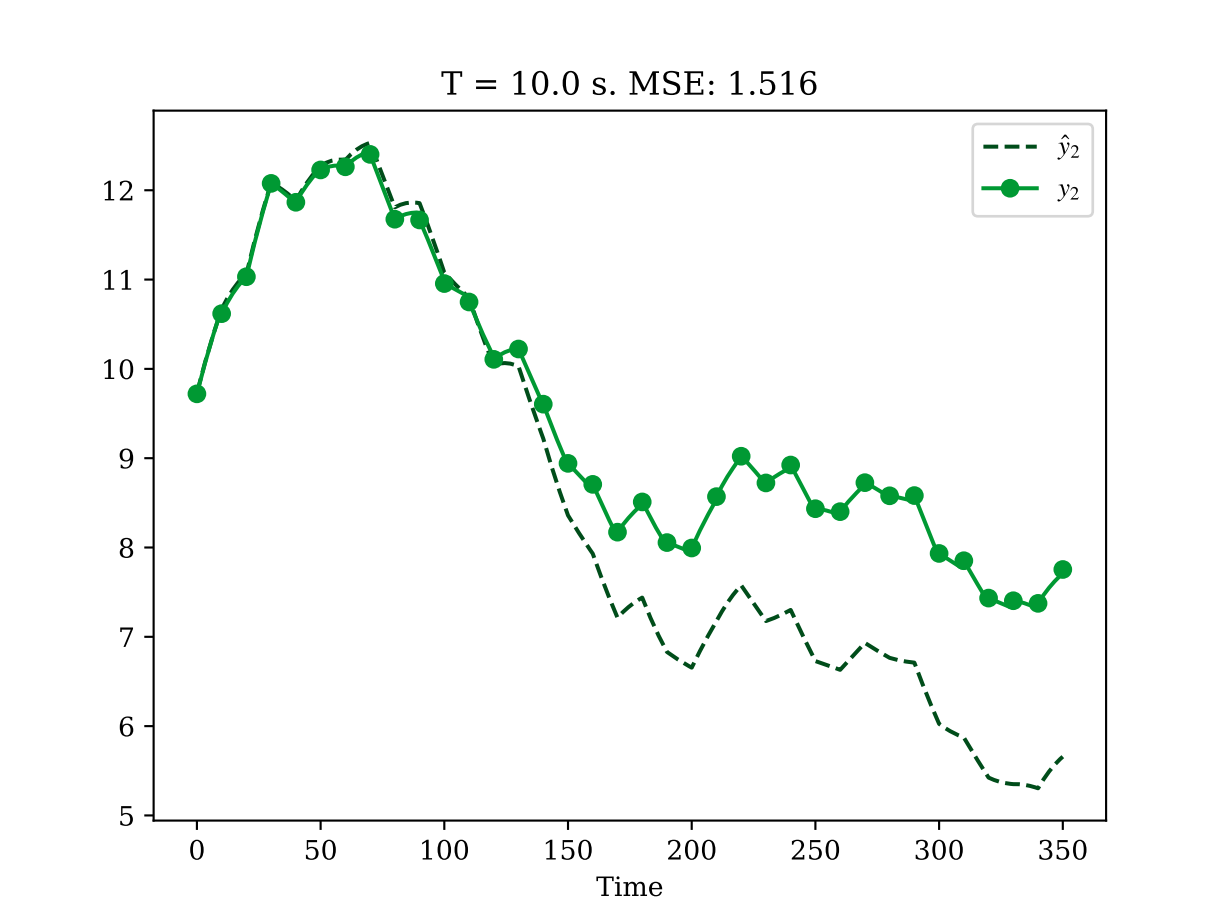

T = 5.0 s. MSE: 6.57
$\hat{y}_1$
y_1
7
6
5
4
3
0
50
100
150
200
250
300
350
Time

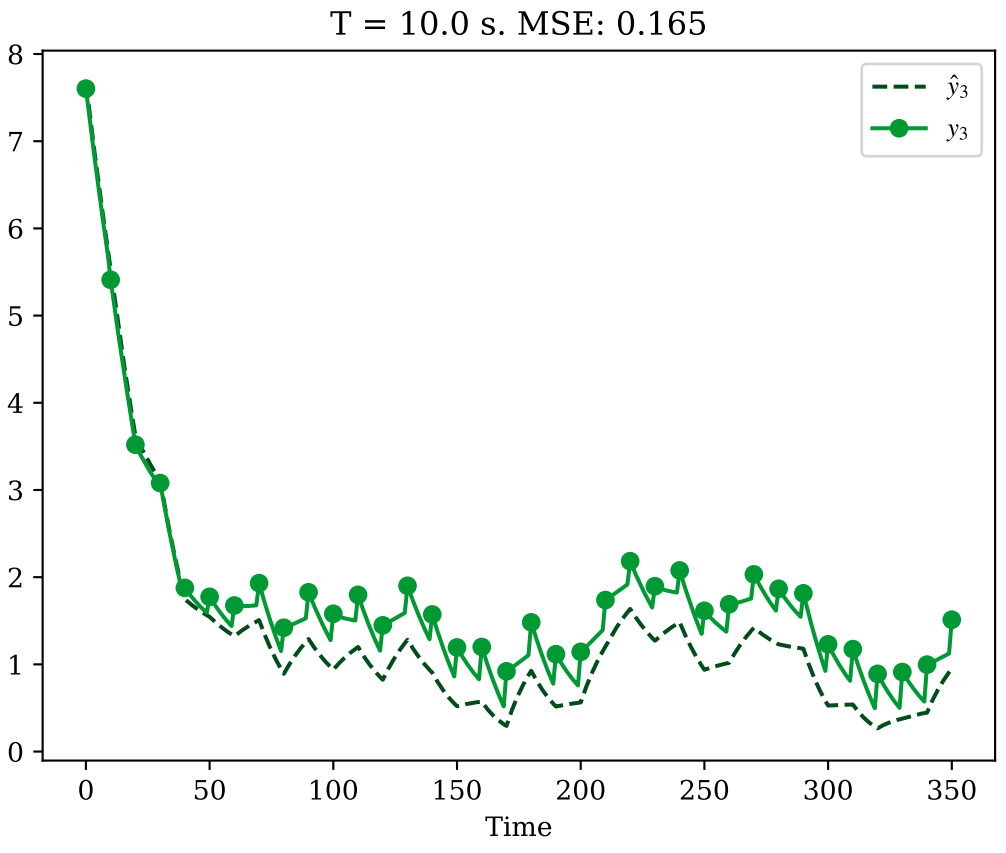

T = 5.0 s. MSE: 4.814
$\hat{y}_2$
y_2
12
11
10
9
8
7
6
5
0
50
100
150
200
250
300
350
Time

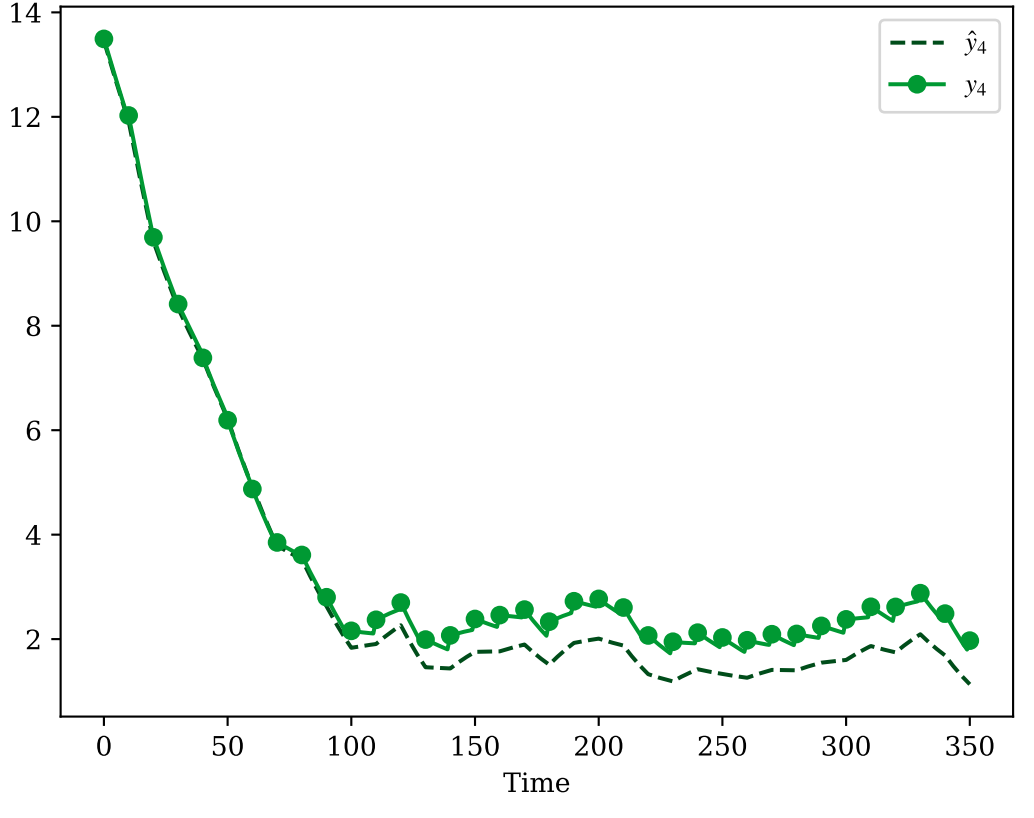

T = 5.0 s. MSE: 2.084
$\hat{y}_3$
y_3
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300
350
Time

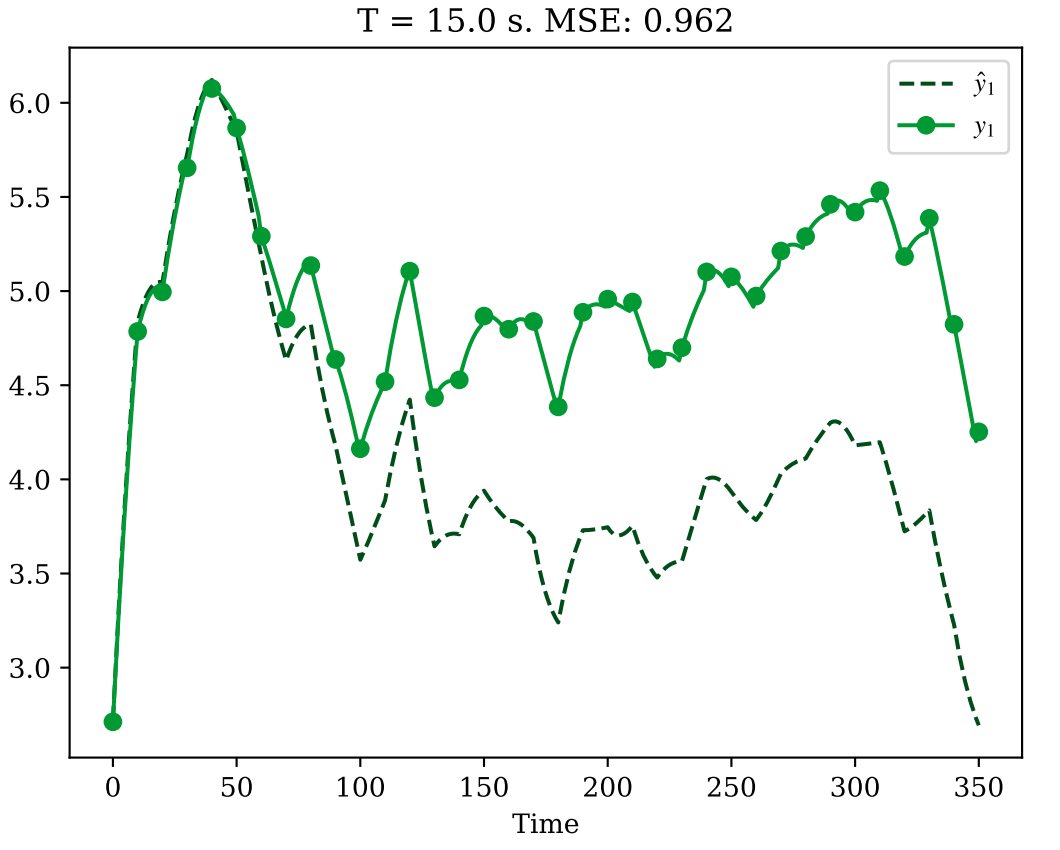

T = 5.0 s. MSE: 1.493
$\hat{y}_4$
y_4
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time

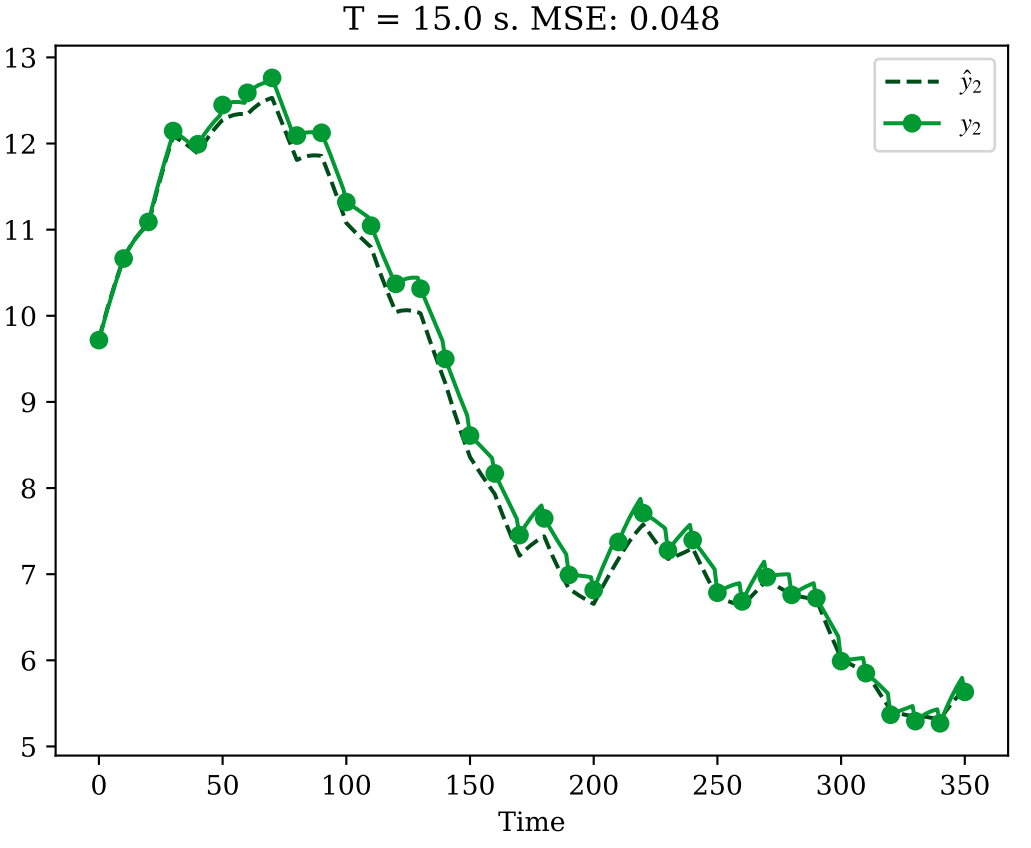

T = 10.0 s. MSE: 0.704
$\hat{y}_1$
y_1
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
50
100
150
200
250
300
350
Time

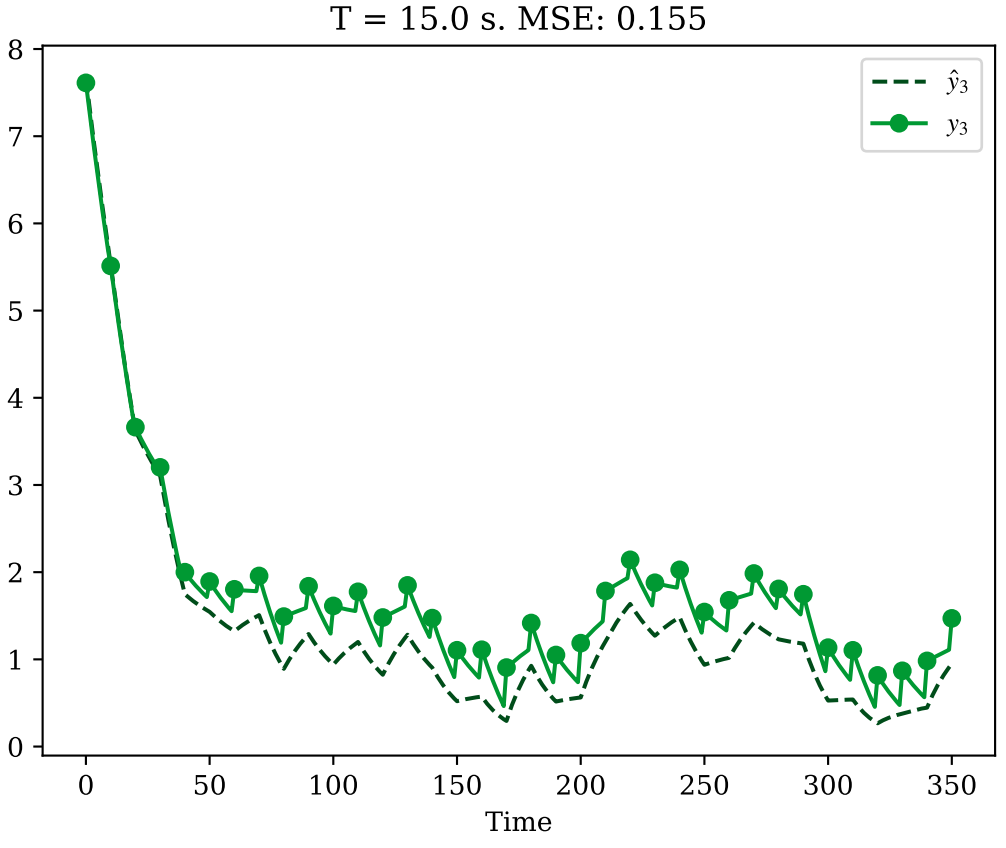

T = 10.0 s. MSE: 1.516
$\hat{y}_2$
y_2
12
11
10
9
8
7
6
5
0
50
100
150
200
250
300
350
Time

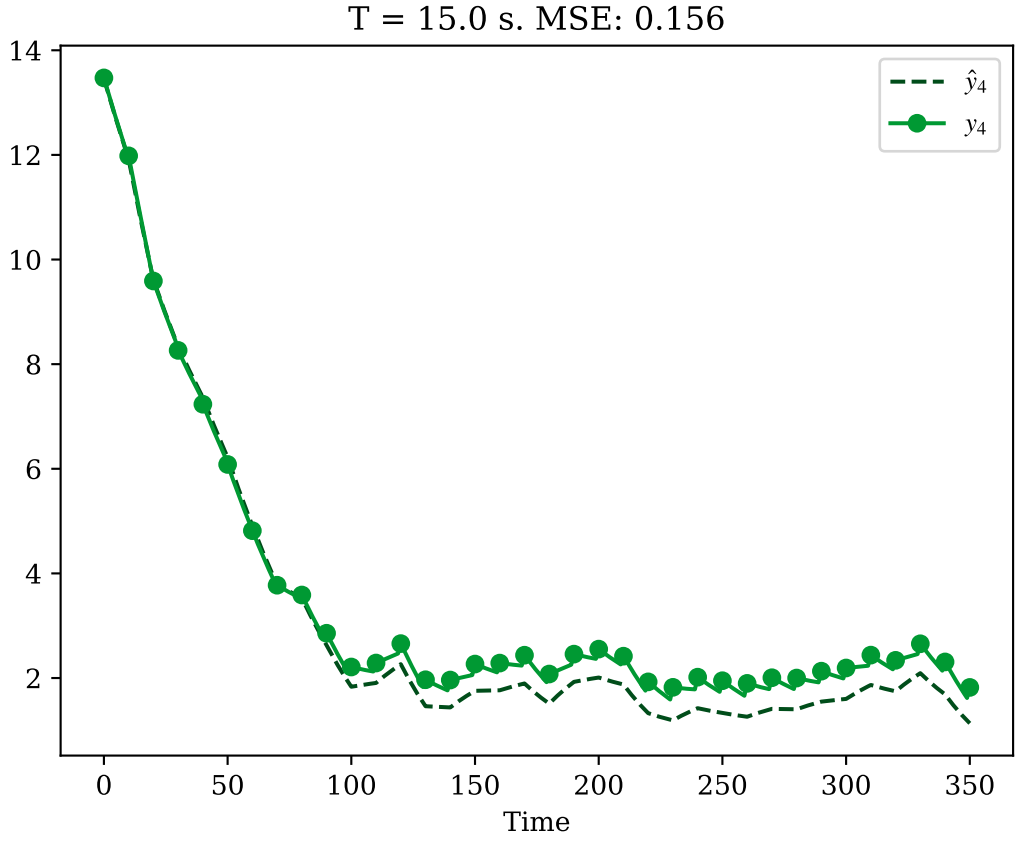

T = 10.0 s. MSE: 0.165
$\hat{y}_3$
y_3
8
7
6
5
4
3
2
1
0
0
50
100
150
200
250
300
350
Time

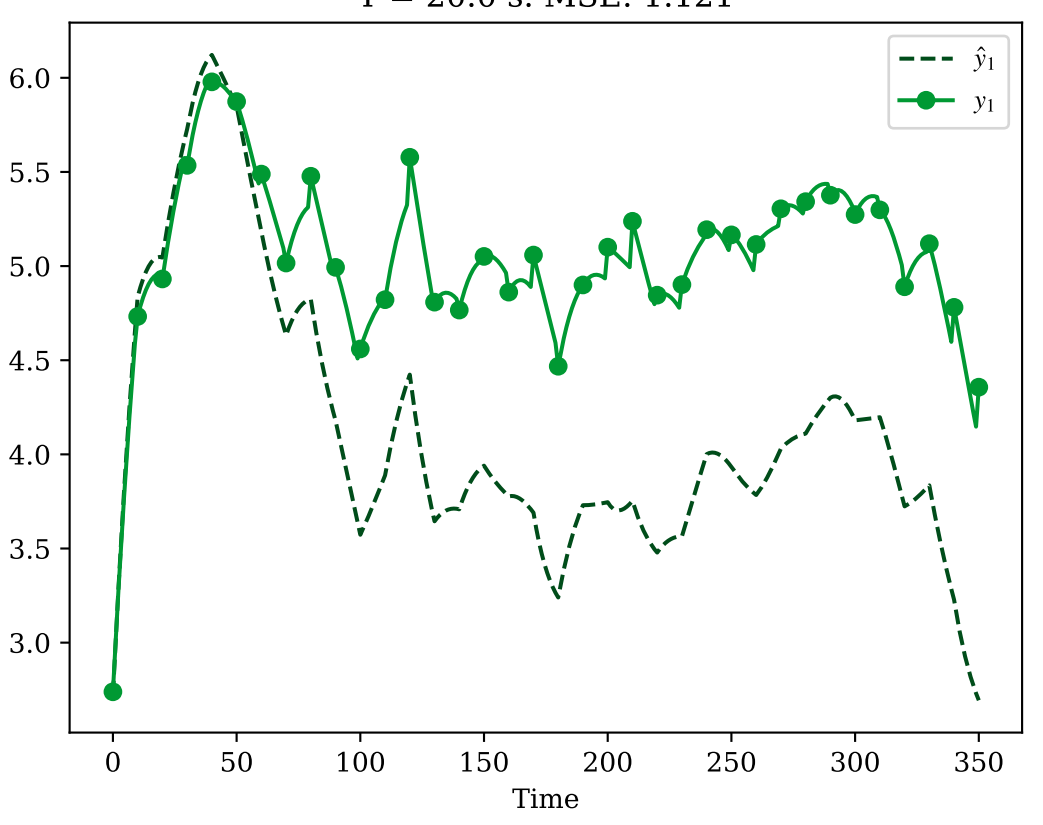

T = 10.0 s. MSE: 0.267
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time
$\hat{y}_4$
y_4

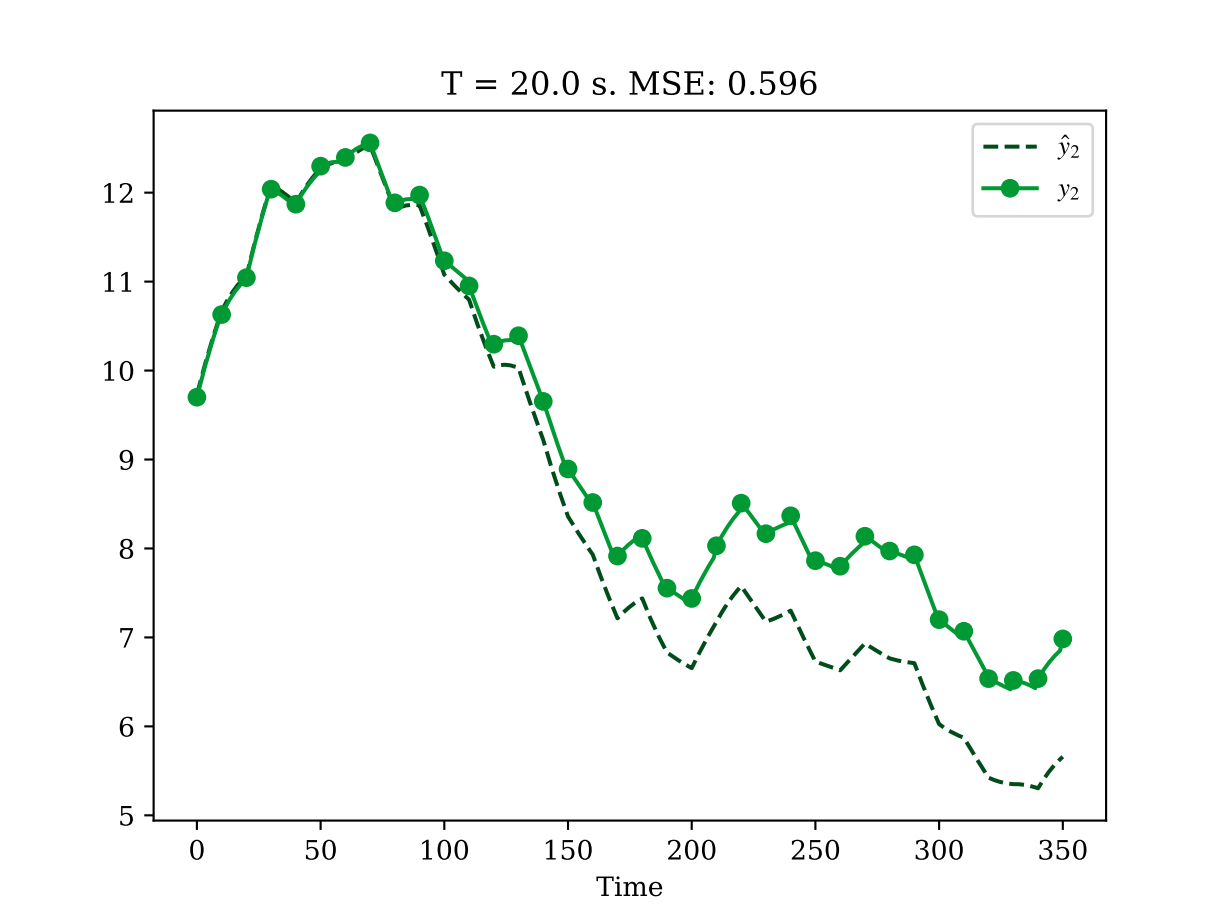

T = 15.0 s. MSE: 0.962
$\hat{y}_1$
y_1
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
50
100
150
200
250
300
350
Time

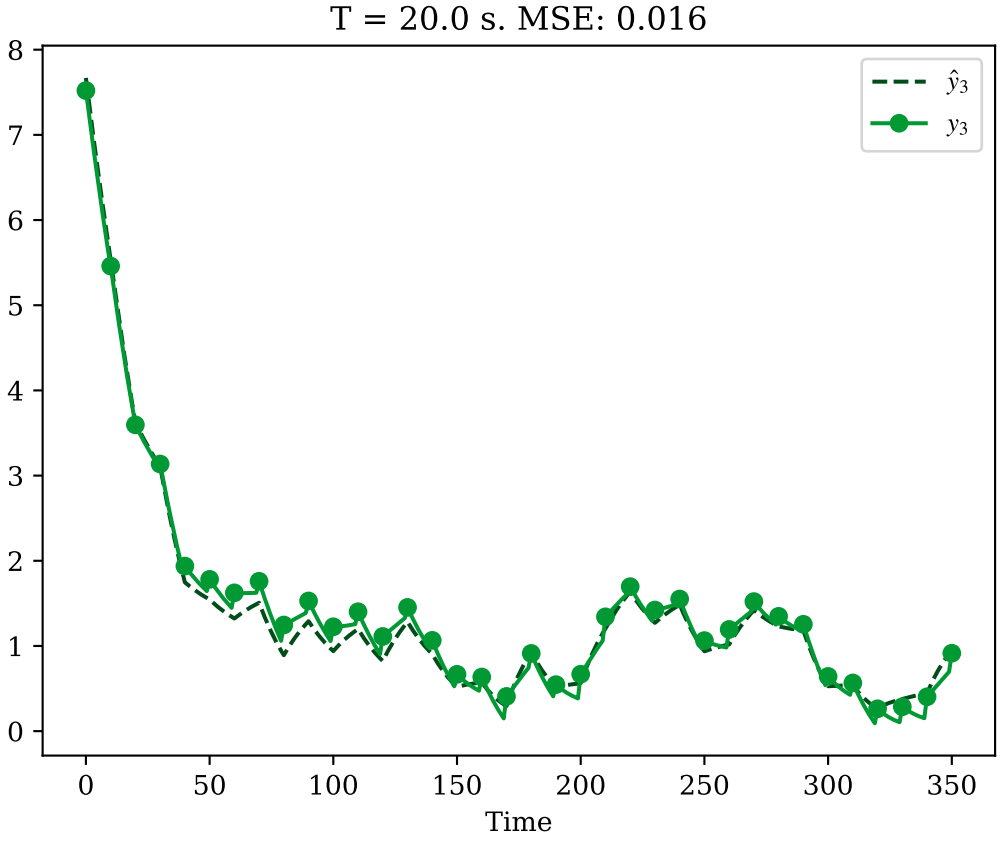

T = 15.0 s. MSE: 0.048
$\hat{y}_2$
y_2
13
12
11
10
9
8
7
6
5
0
50
100
150
200
250
300
350
Time

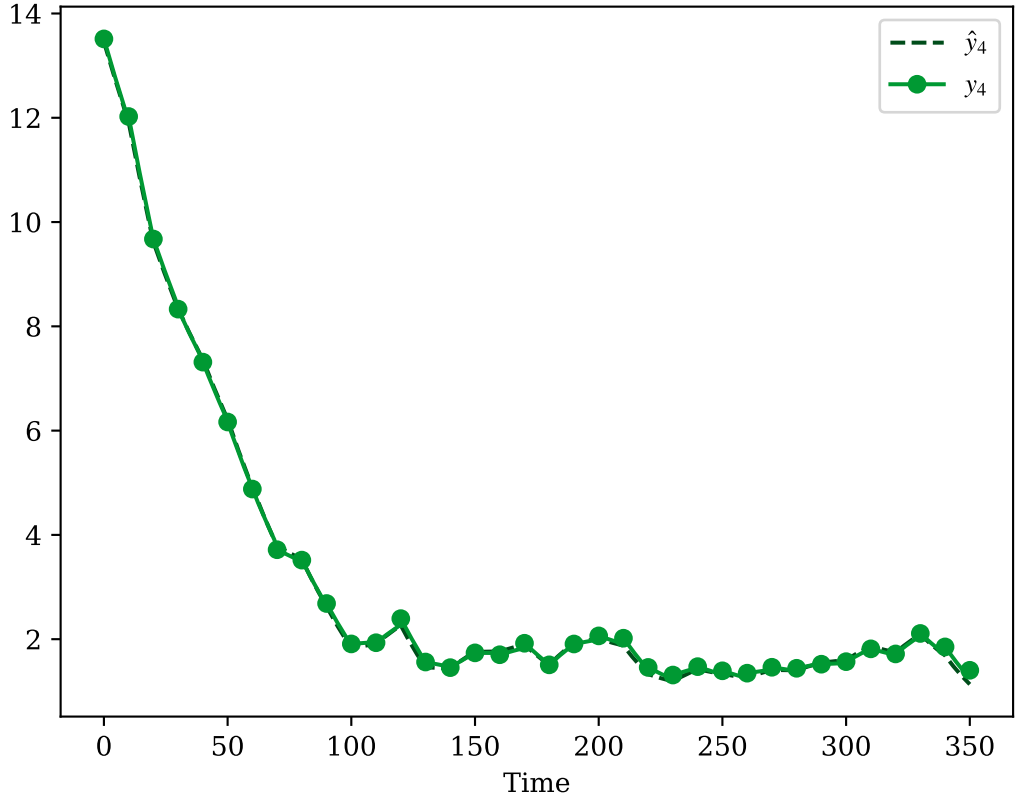

T = 15.0 s. MSE: 0.155
$\hat{y}_3$
y_3
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300
350
Time

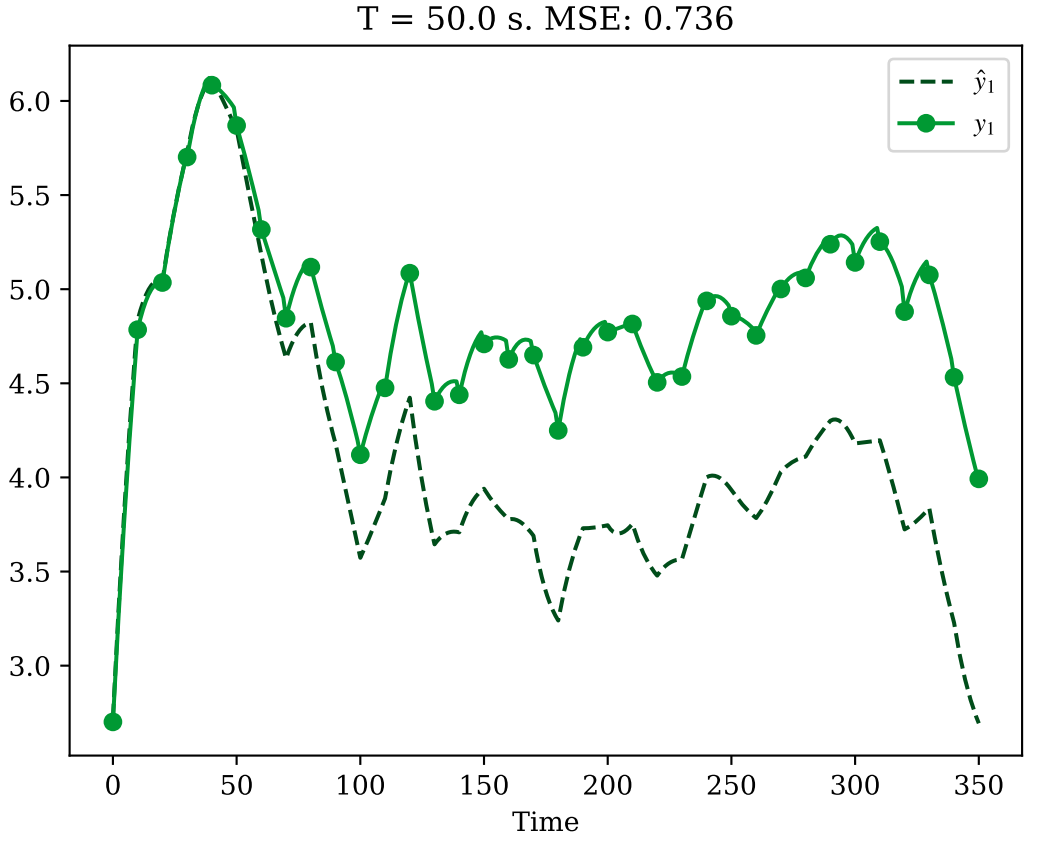

T = 15.0 s. MSE: 0.156
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time
$\hat{y}_4$
y_4

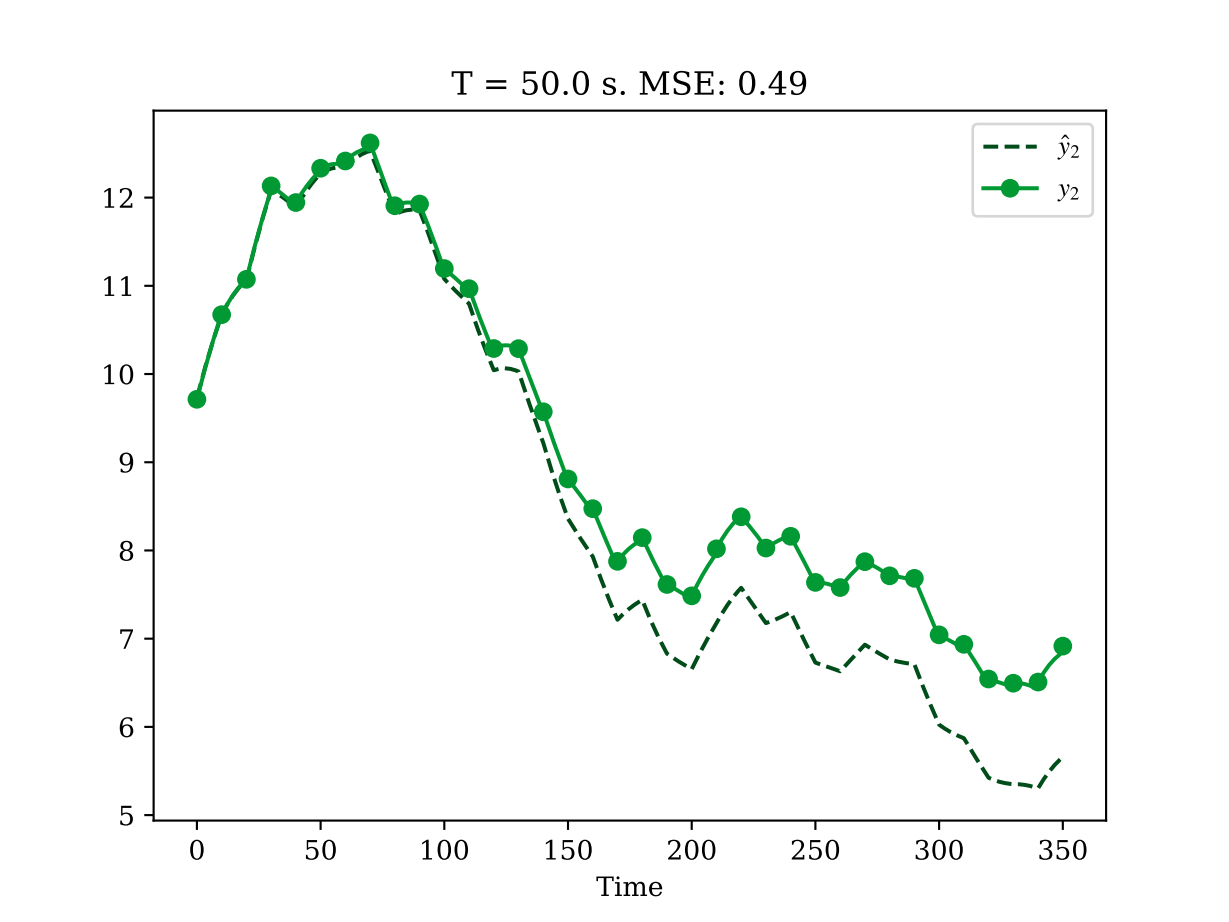

T = 20.0 s. MSE: 1.121
$\hat{y}_1$
y_1
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
50
100
150
200
250
300
350
Time

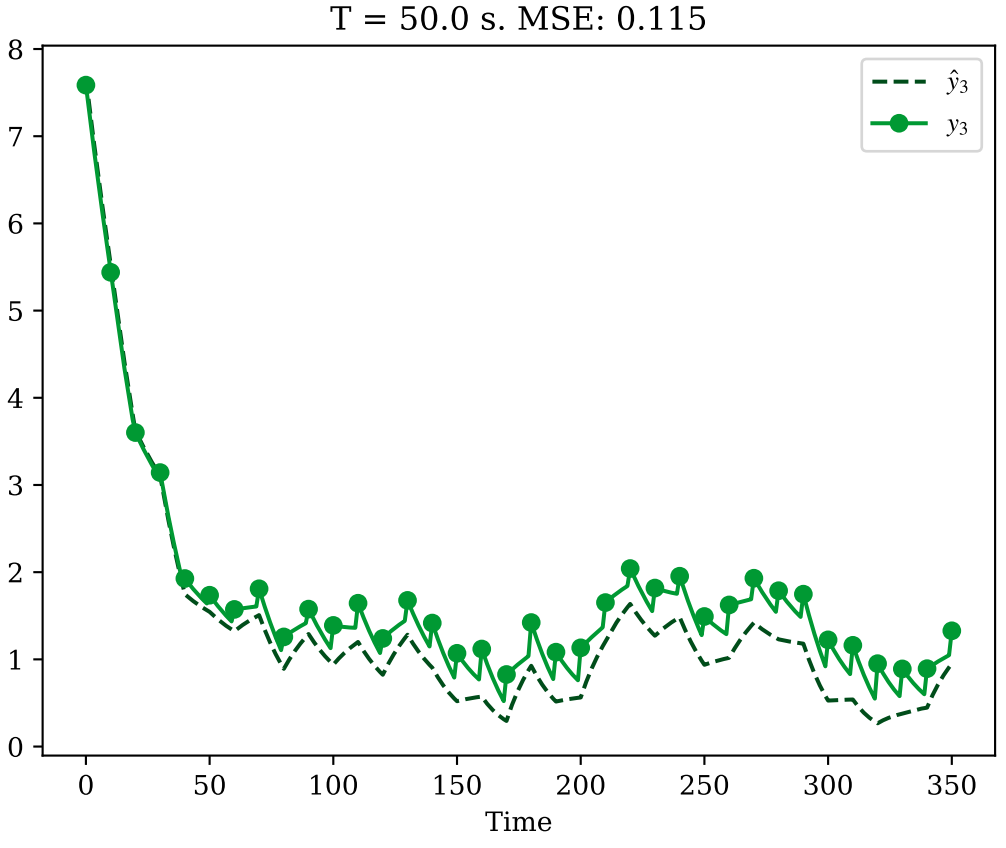

T = 20.0 s. MSE: 0.596
$\hat{y}_2$
y_2
12
11
10
9
8
7
6
5
0
50
100
150
200
250
300
350
Time

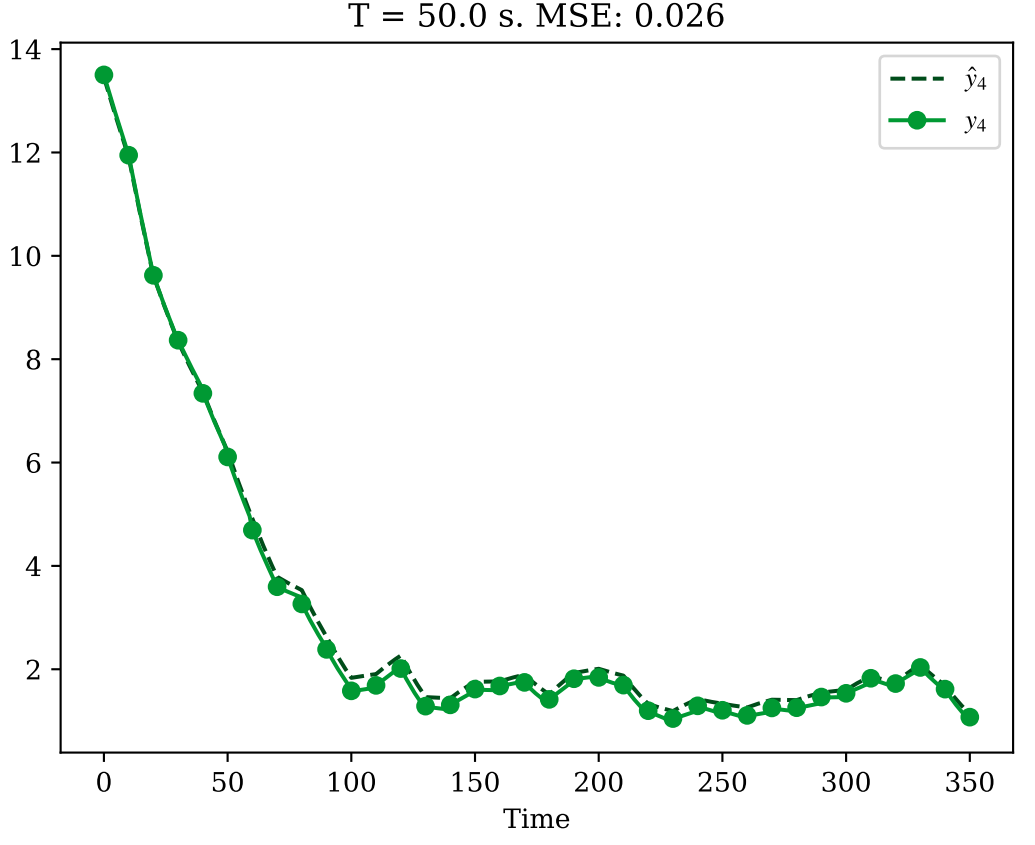

T = 20.0 s. MSE: 0.016
$\hat{y}_3$
y_3
8
7
6
5
4
3
2
1
0
0
50
100
150
200
250
300
350
Time


T = 20.0 s. MSE: 0.004
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time
$\hat{y}_4$
y_4


T = 50.0 s. MSE: 0.736
$\hat{y}_1$
y_1
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
50
100
150
200
250
300
350
Time


T = 50.0 s. MSE: 0.49
$\hat{y}_2$
y_2
12
11
10
9
8
7
6
5
0
50
100
150
200
250
300
350
Time


T = 50.0 s. MSE: 0.115
$\hat{y}_3$
y_3
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300
350
Time


T = 50.0 s. MSE: 0.026
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
Time
$\hat{y}_4$
y_4