

ELEC-E8103 - Modelling, Estimation and Dynamic Systems

Assignment 5

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1 System 1: model oe323

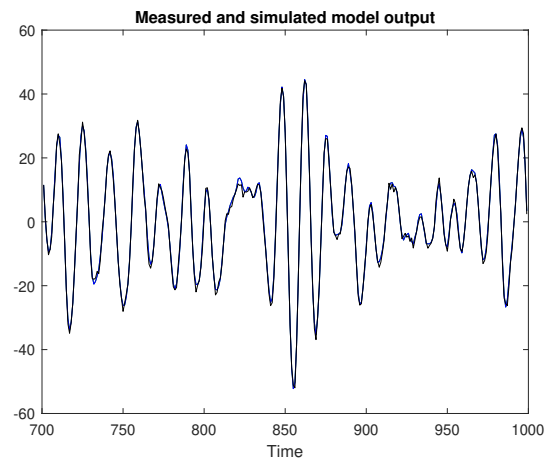


Figure 1: oe323 output

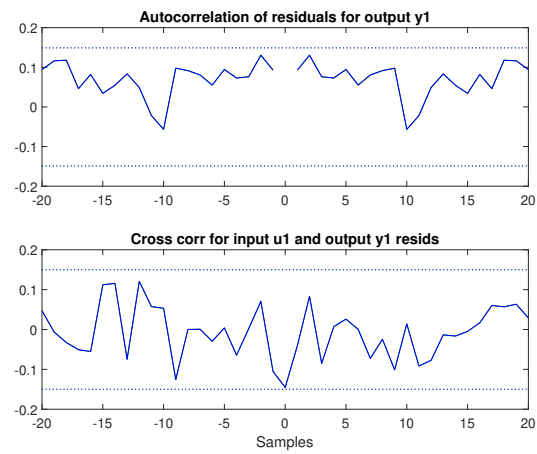


Figure 2: oe323 residual

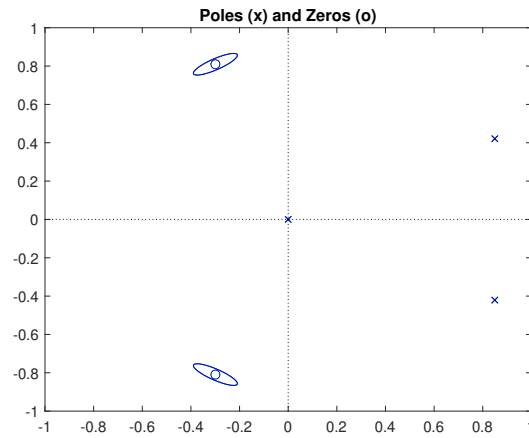


Figure 3: oe323 poles and zeros

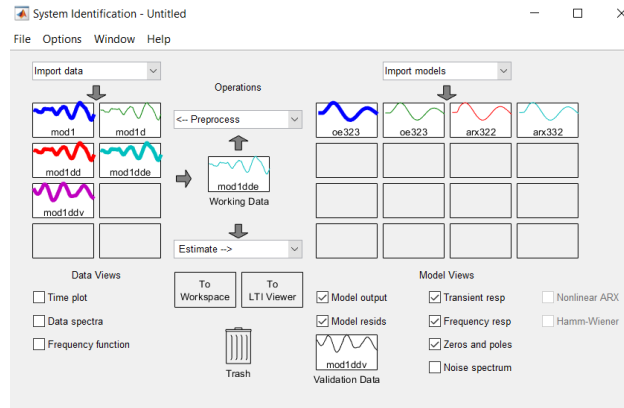


Figure 4: System 1 tried models

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Discrete-time OE model:  $y(t) = [B(z)/F(z)]u(t) + e(t)$ 
 $B(z) = 1.245 z^{-3} + 0.7452 z^{-4} + 0.9271 z^{-5}$ 

 $F(z) = 1 - 1.699 z^{-1} + 0.8988 z^{-2}$ 

Name: oe323
Sample time: 1 seconds
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Figure 5: oe323 model

2 System 2: model arx224

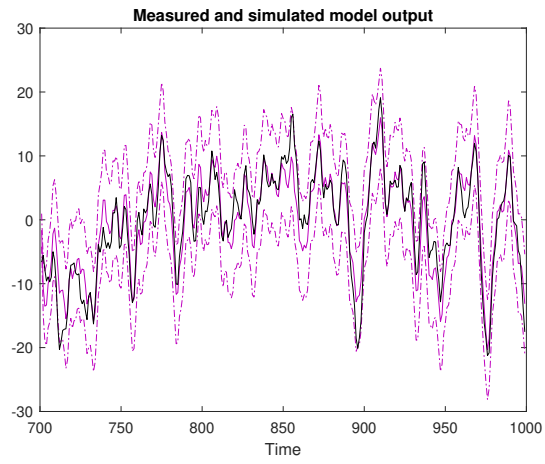


Figure 6: arx224 output

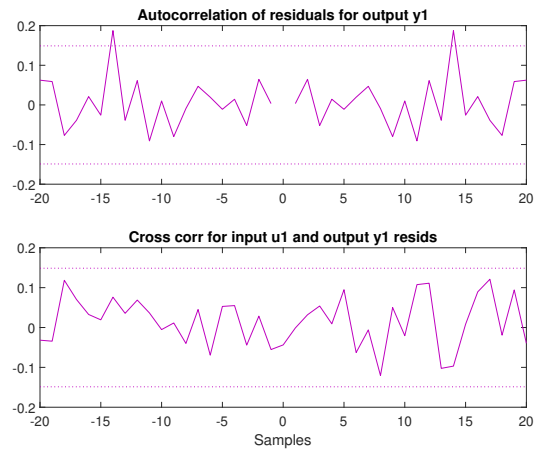


Figure 7: arx224 residual

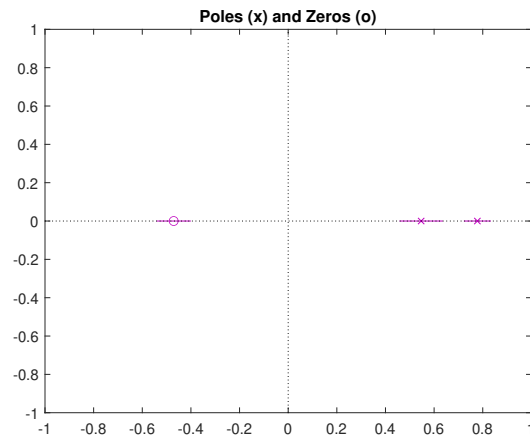


Figure 8: arx224 poles and zeros

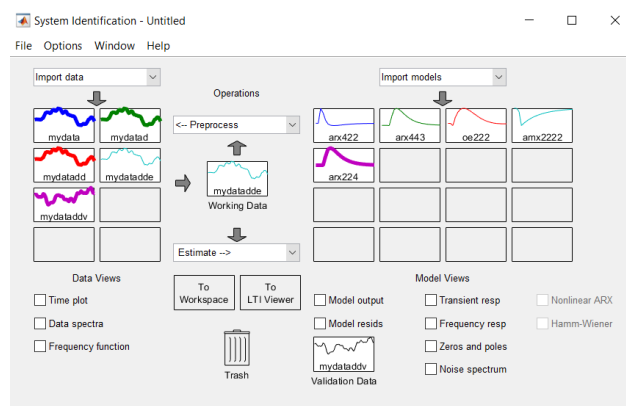


Figure 9: System 2 tried models

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Discrete-time ARX model:  $A(z)y(t) = B(z)u(t) + e(t)$ 
 $A(z) = 1 - 1.325 z^{-1} + 0.4253 z^{-2}$ 

 $B(z) = 1.969 z^{-4} + 0.9272 z^{-5}$ 

Name: arx224
Sample time: 1 seconds
```

Figure 10: arx224 model

3 System 3: model armax2222

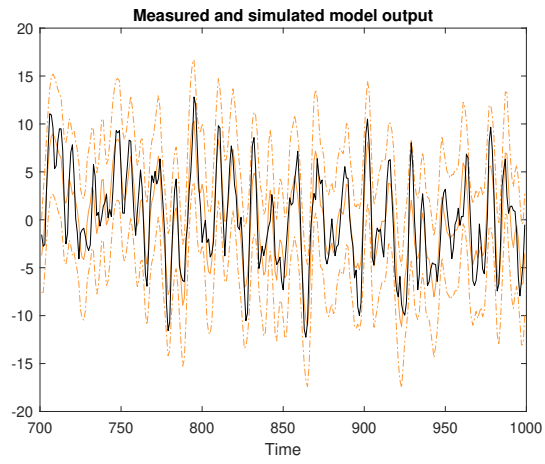


Figure 11: armax2222 output

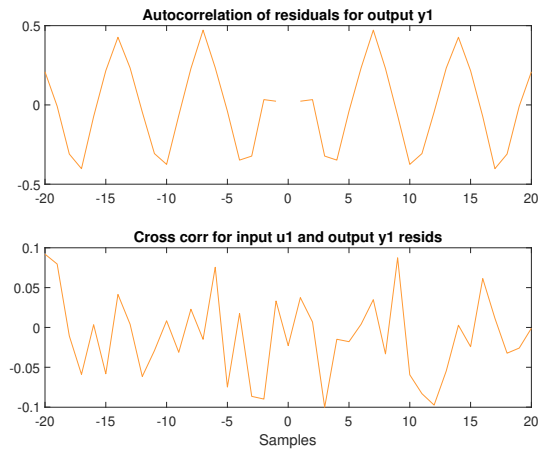


Figure 12: armax2222 residual

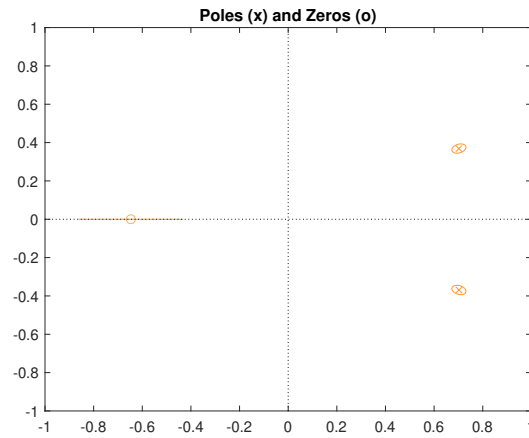


Figure 13: armax22224 poles and zeros

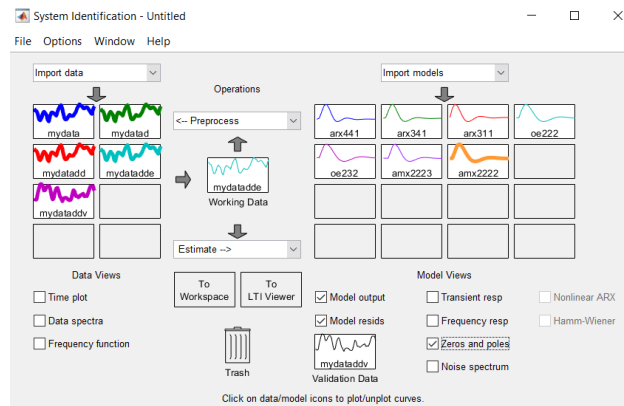


Figure 14: System 3 tried models

Discrete-time ARMAX model: $A(z)y(t) = B(z)u(t) + C(z)e(t)$

$$A(z) = 1 - 1.404 z^{-1} + 0.6288 z^{-2}$$

$$B(z) = 1.049 z^{-2} + 0.6789 z^{-3}$$

$$C(z) = 1 - 0.4808 z^{-1} - 0.3721 z^{-2}$$

Name: amx2222
Sample time: 1 seconds

Figure 15: armax2222 model

4 System 4: model bj12121

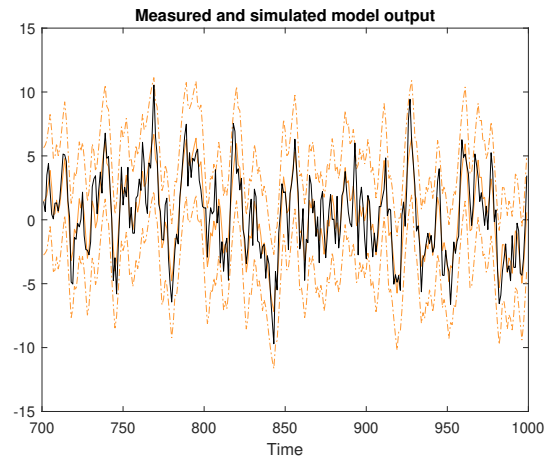


Figure 16: bj12121 output

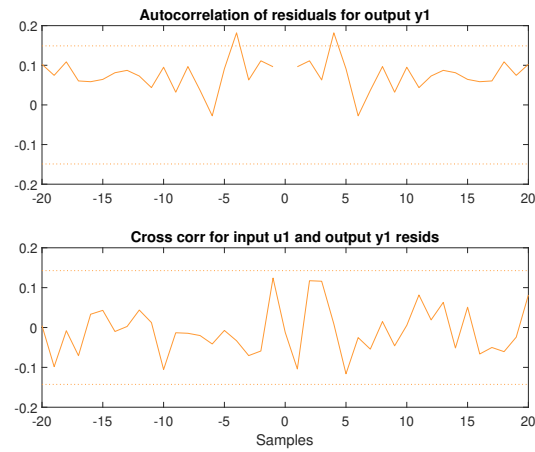


Figure 17: bj12121 residual

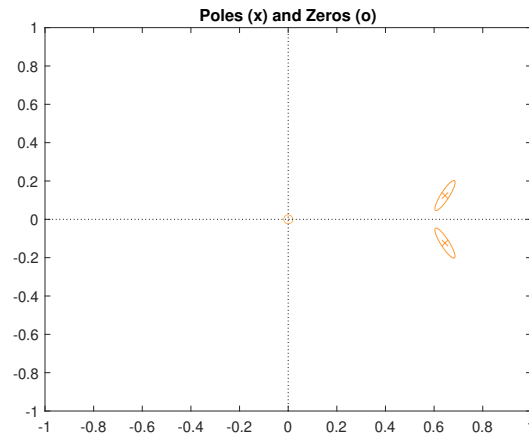


Figure 18: bj12121 poles and zeros

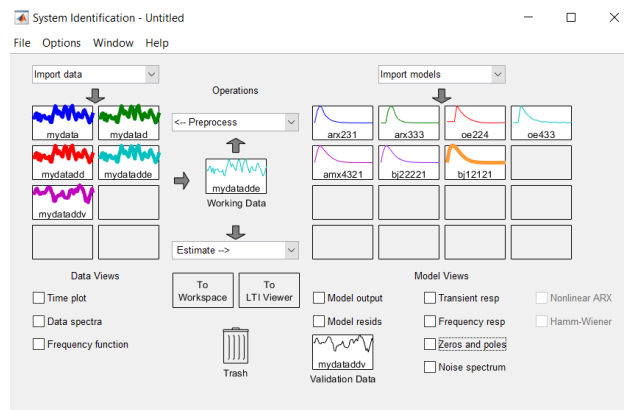


Figure 19: System 4 tried models

Discrete-time ARMAX model: $A(z)y(t) = B(z)u(t) + C(z)e(t)$

$$A(z) = 1 - 1.404 z^{-1} + 0.6288 z^{-2}$$

$$B(z) = 1.049 z^{-2} + 0.6789 z^{-3}$$

$$C(z) = 1 - 0.4808 z^{-1} - 0.3721 z^{-2}$$

Name: amx2222
Sample time: 1 seconds

Figure 20: bj12121 model

5 System 5: model bj11221

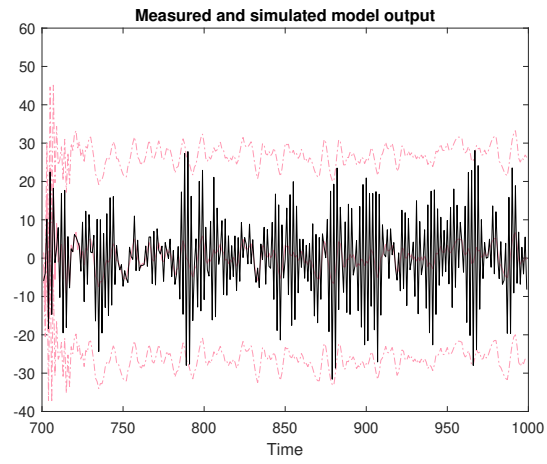


Figure 21: bj11221 output

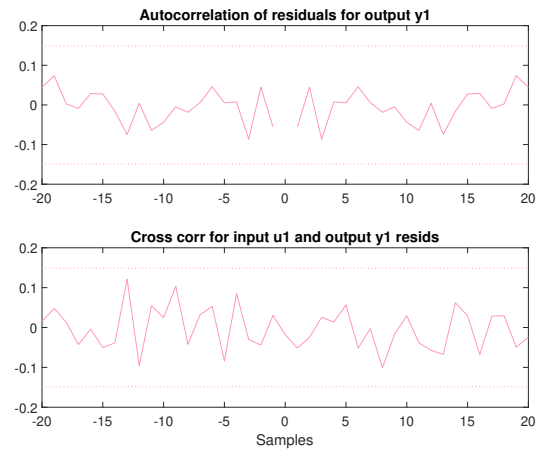


Figure 22: bj11221residual

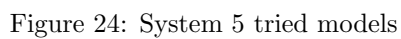
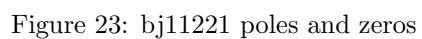


Figure 25: bj11221 model