

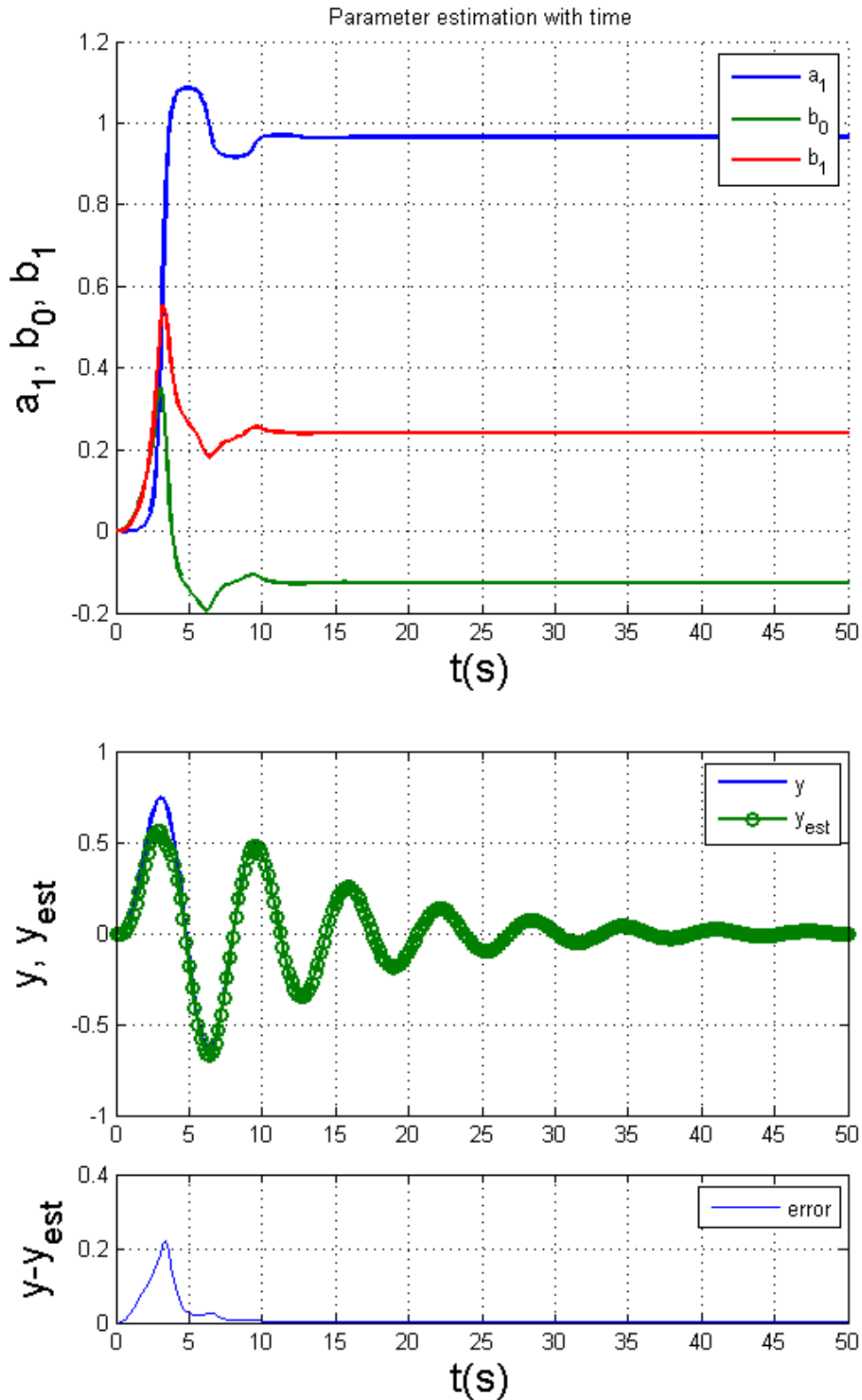
Problem statement:

Estimate the parameter of $G(s) = \frac{0.5}{s^2+s+1}$ using input function $u = 2 e^{-0.4t} \sin(0.8t)$ using Kaczmarz Algorithm

solution

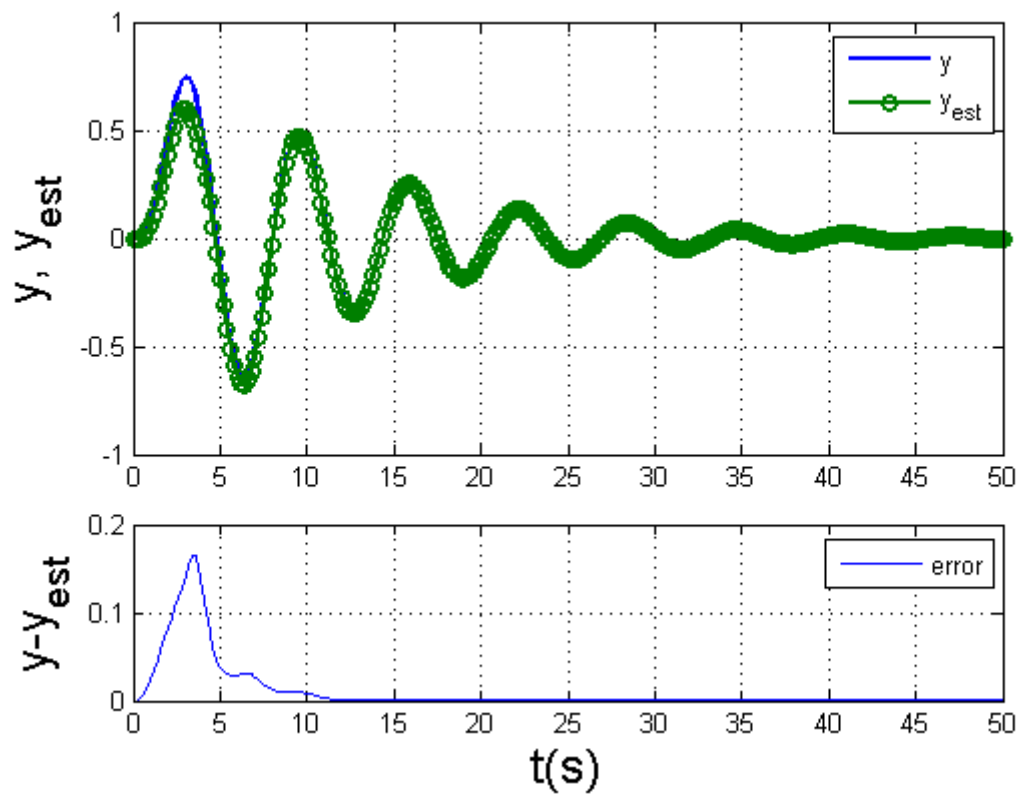
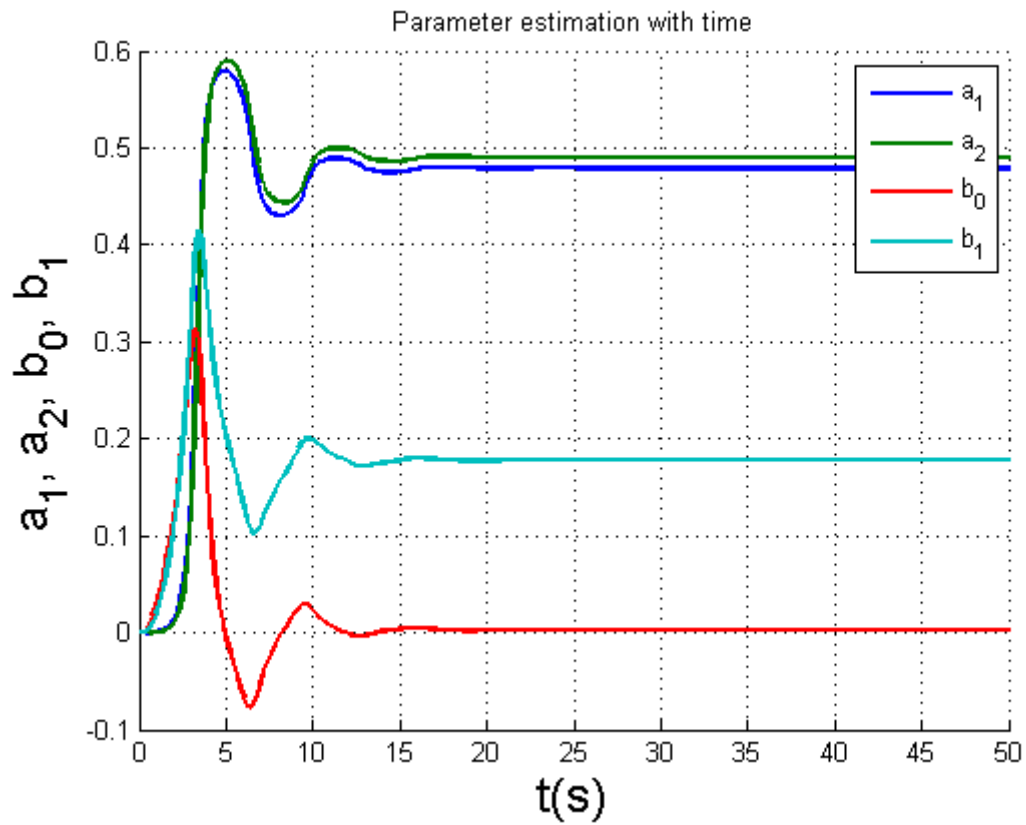
$$G(z) = \frac{0.009335z+0.008732}{z^2-1.783z+0.8187} ; T = 0.2$$

For 1st order estimation:



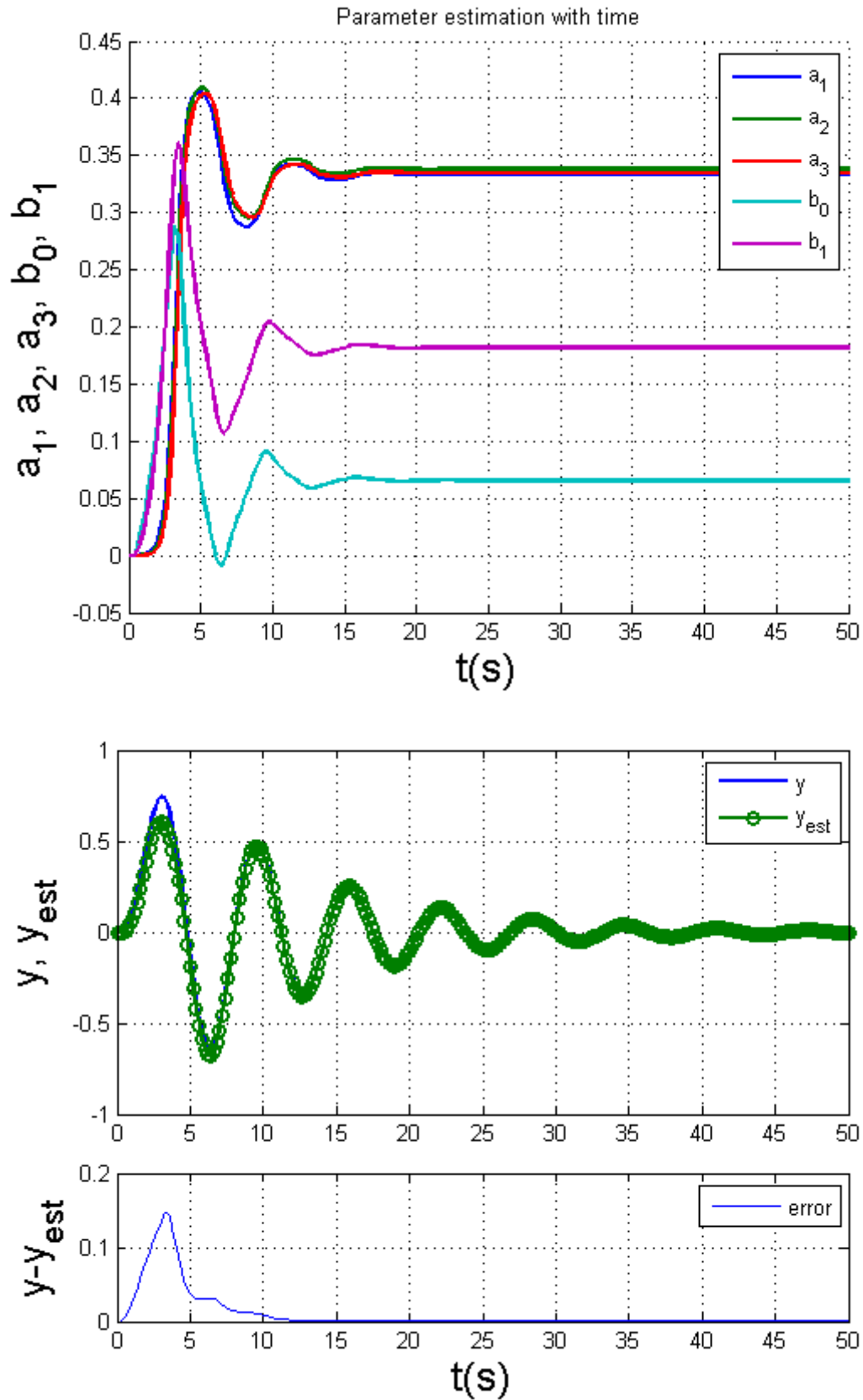
$$G(z) = \frac{-0.1267z + 0.2409}{z - 0.9652}$$

For 2nd order estimation:



$$G(z) = \frac{0.002579z + 0.1778}{z^2 - 0.4792z - 0.4904}$$

For 3rd order estimation:



$$G(z) = \frac{0.06555z + 0.1819}{z^3 - 0.3333z^2 - 0.3382z - 0.3347}$$

Conclusion:

Although the parameter does not converge to the true parameter, the error of the output is not large.
The estimation stability depends on the parameter γ