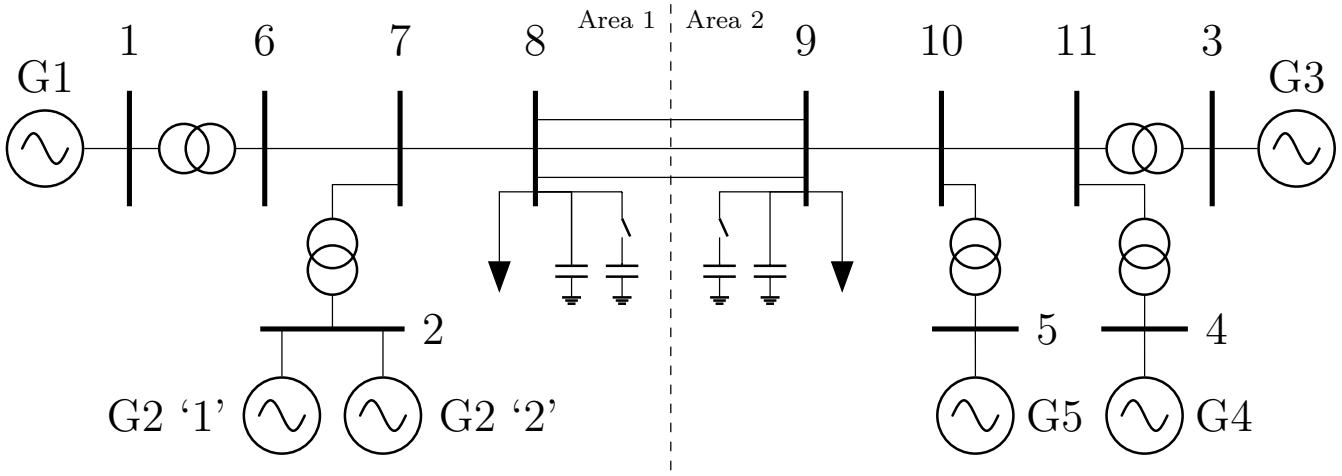
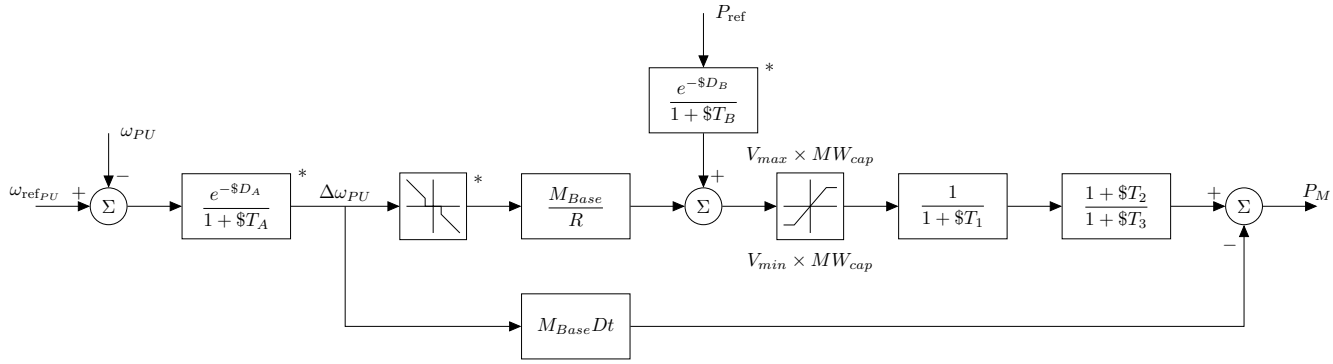
Scenario: Two area, six machine system loss of generation event.



Governed machines are: G1, G2 '1', G3, G4.
Governor time constants identical for all machines and have no deadband.
AGC signals are sent every 5 seconds.

At t = 2, G2 '2', steps down its Pm output by 20%.

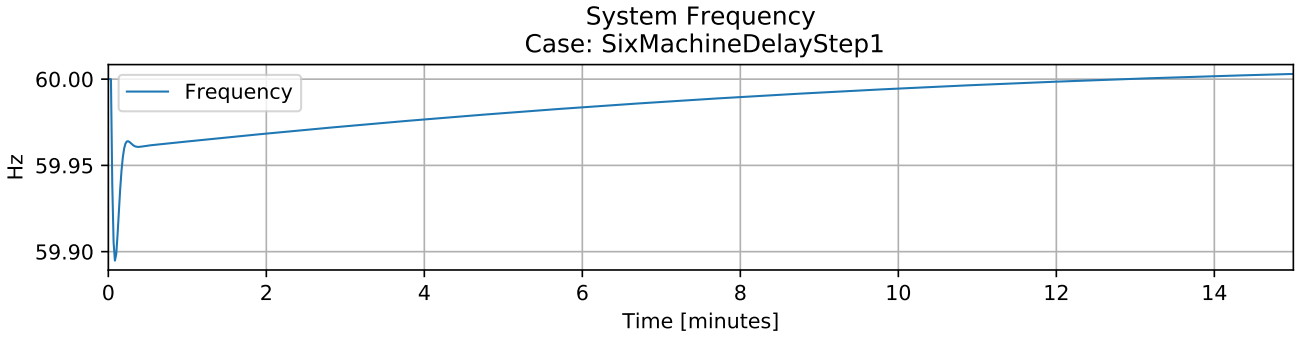
All system settings are the same in both cases, with the exception of added governor delays on G3.

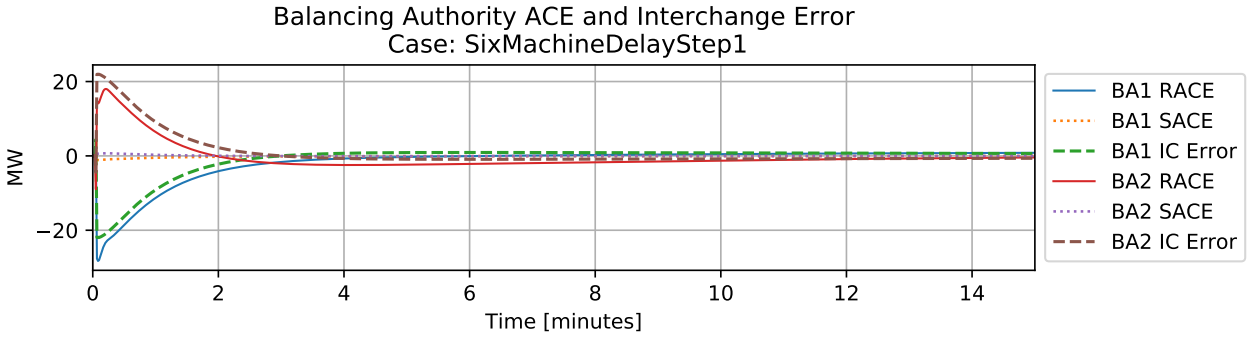


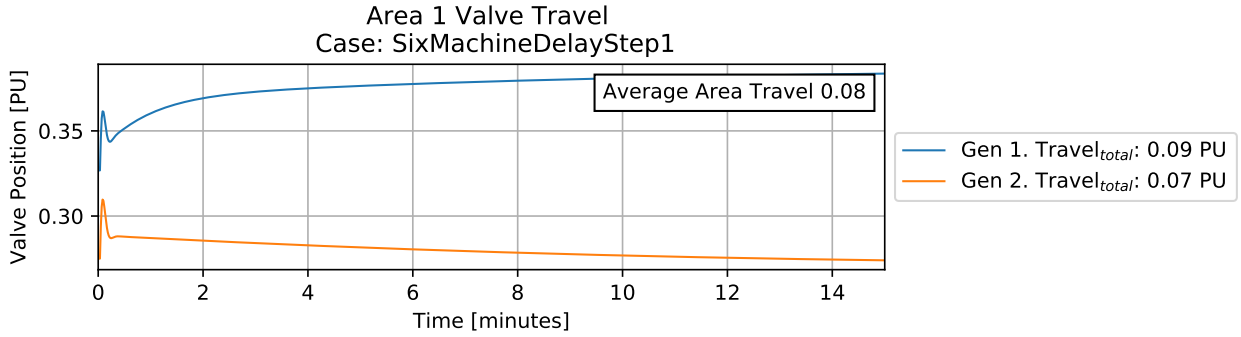
Input $\Delta\omega_{PU}$ is delayed by 40 seconds and any changes to P_{REF} are delayed by 10 seconds.

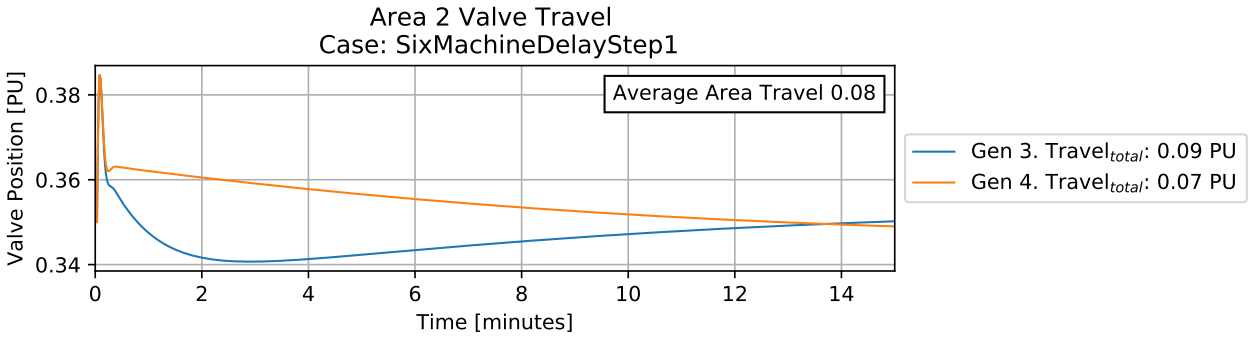
Summary Results: The delayed governor generates a second frequency perturbance 40 seconds after the first frequency drop caused by the loss of generation. The delay also introduces minor oscillations in frequency that are eventually damped out. Additionally, the delay case has a larger frequency nadir and takes longer to cross zero than the no delay case.
Valve travel is increased by roughly 50% due to the delayed governor action.

Base Case - No Delay Results:









Delay Case - 40 sec w delay, 10 sec Pref Delay Results: