LAG LEAD COMPENSATOR
A lag compensator is one which adds a pole the system and is used to improve the steady state response of the system. A lag compensator provides phase lag (negative phase) in the frequency response of system.

Using the concept of virtual ground the op amp lag compensator can be Designed and the circuit can be validated.
A lead compensator is one which adds a zero the system and is used to improve the transient response of the system. A lead compensator provides phase lead (positive phase) in the frequency response of system.

Using the concept of virtual ground the op amp lead compensator can be Designed and the circuit can be validated.
Circuit Topology for Lag Compensator
Circuit Topology for Lead Compensator
Waveforms

Lag Compensator

Lead Compensator
Generally the purpose of the Lead and Lag compensator is to create a controller which has an overall magnitude of approximately 1. The lead-lag compensator is largely used for phase compensation rather than magnitude.

Lead and lag control are used to add or reduce phase between 2 frequencies. Typically these frequencies are centered around the open loop crossover frequency. A lead filter typically has unity gain (0 dB) at low frequencies while the lag provides a non unity gain at low frequencies.

The phase-lag compensator looks similar to phase-lead compensator, except that is now less than 1. The main difference is that the lag compensator adds negative phase to the system over the specified frequency range, while a lead compensator adds positive phase over the specified frequency range.
The advantages of a full-wave bridge rectifier is that it has a smaller AC ripple value for a given load and a smaller reservoir or smoothing capacitor than an equivalent half-wave rectifier circuit. The fundamental frequency of the ripple voltage is twice that of the AC supply frequency 100Hz where for the half-wave rectifier it is exactly equal to the supply frequency 50Hz. The amount of ripple voltage that is superimposed on top of the DC supply voltage by the diodes can be virtually eliminated by adding a much improved filter to the output terminals of the bridge. Low-pass filter consists of two smoothing capacitors of the same value and a choke or inductance across them to introduce a high impedance path to the alternating ripple component.
Conclusion

- A lead-lag compensator combines the effects of a lead compensator with those of a lag compensator. The result is a system with improved transient response, stability, and steady-state error.

- The combination of the Lag compensator and the Lead compensator gives the design of the Lag-Lead compensator.

- To implement a lead and lag compensator, first design the lead compensator to achieve the desired transient response and stability, and then design a lag compensator to improve the steady-state response of the lead-compensated system.

- Thus the Lag Compensator and the Lead Compensator is Implemented using the Solid thinking Activate tool.