Steady–state response performance

After the transient response has settled—that is, reached steady-state—the system may or may not be in a desirable state. If the response asymptotically approaches any state other than that commanded, it is said to have steady-state error. These arise from three primary sources:

1. nonlinearities, like backlash in gears—we won't explore this one;
2. disturbances, like those from the environment; and
3. input (command) type and the plant dynamics.

We will focus our attention on item 3; item 2 is similar.

$R = Y$ zero SS error