

②

(d)

$$K = 2.$$

$$\rightarrow G(s) = \frac{1}{s^2 + 2s + 2}$$

Roots

$$s = \frac{-2 \pm \sqrt{4 - 8}}{2}$$

$$= -1 \pm j$$

Roots =  $-1 + j$ ,  $-1 - j$

Hence the system becomes underdamped.

The plots of both transfer functions in (c) and (d) (achieved by MATLAB) are shown in the next page.