NAME:
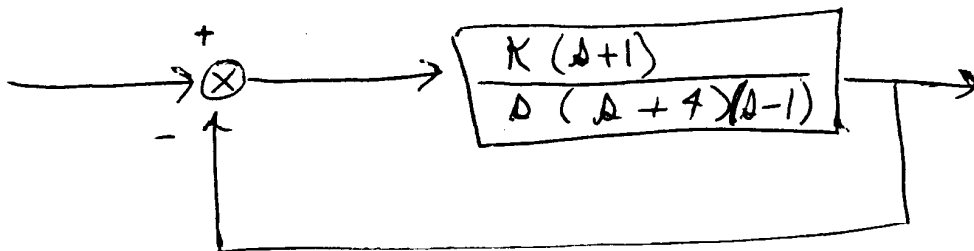
Honor Code: KEY

Design a PD controller so that
the following system has

$$\Delta = -1 \pm 2j$$

on the locus. SKETCH the Compensated locus.

$$\frac{K(\Delta+1)}{\Delta(\Delta+4)(\Delta-1)}$$

For a point to be on the locus,

$$\sum \text{angles}(\Delta - p_i) - \sum \text{angles}(\Delta - z_i)$$
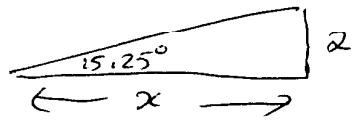
must be an odd multiple of $180°$

Pole @ 0 $\theta = 116.56°$ pole @ -4 $\theta = 33.69°$

Pole @ 1 : $\theta = 135°$ zero @ -1 $\theta = 90°$

$$\sum \angle(\text{poles}) - \sum \angle(\text{zeros}) = 116.56° + 33.69° + 135° - 90° - \angle z_c$$
$$= 195.25° - \angle z_c \qquad \text{choose } \angle z_c = 15.25°$$

— OVER —

$\tan(15.25°) = 2/x$

$x = 7.3359$

z_c at -8.3359

PD: (D + 8.3359)

Imag

$-1 + 2j$

Real