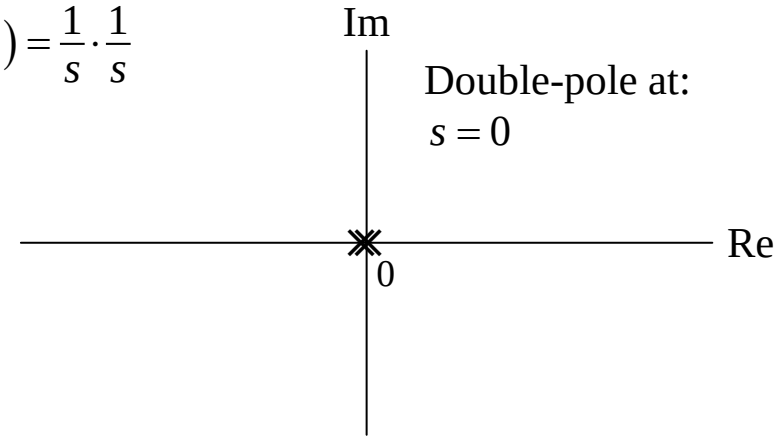
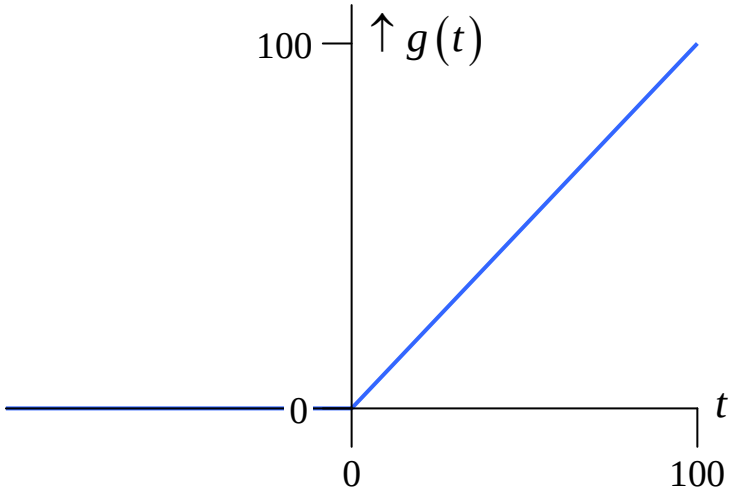
EXAMPLES: Systems with One or More Imaginary Double-Pole(s) are UNSTABLE

$$G(s)=\frac{1}{s}\cdot\frac{1}{s}$$

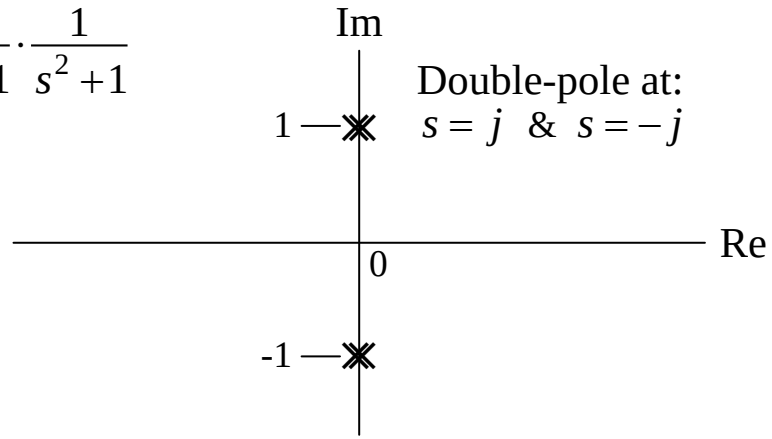


Double-pole at:
$s=0$

$$g(t)=\mathcal{L}^{-1}\{G(s)\}$$
$$=u(t)*u(t)=tu(t)$$



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



Double-pole at:
$s=j$ & $s=-j$

$$g(t)=\mathcal{L}^{-1}\{G(s)\}$$
$$=\sin(t)u(t)*\sin(t)u(t)=0.5(1-t)\sin(t)u(t)$$