16.06 Principles of Automatic Control
Recitation 6

Bode Diagrams

$$\frac{10(s+5)}{(s+0.1)(s+20)}$$

First, re-write in Bode form:

$$\frac{10 \cdot 5(s/5+1)}{0.1(10s+1)20(s/20+1)} = \frac{25(s/5+1)}{(10s+1)(s/20+1)}$$

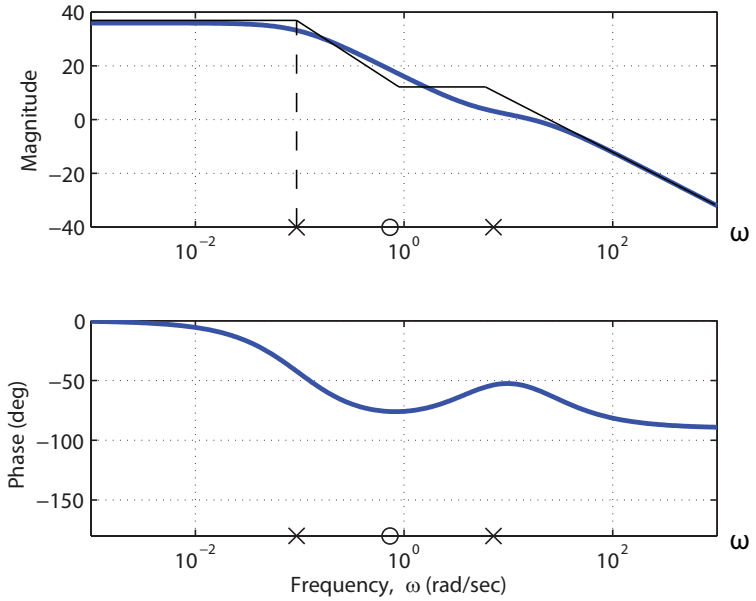
$\alpha = 0$, $K = 25$.

LFA: slope $= \alpha = 0$ $M = 25$ at $\omega = 1$

HFA: slope $= -(n-m) = -1$

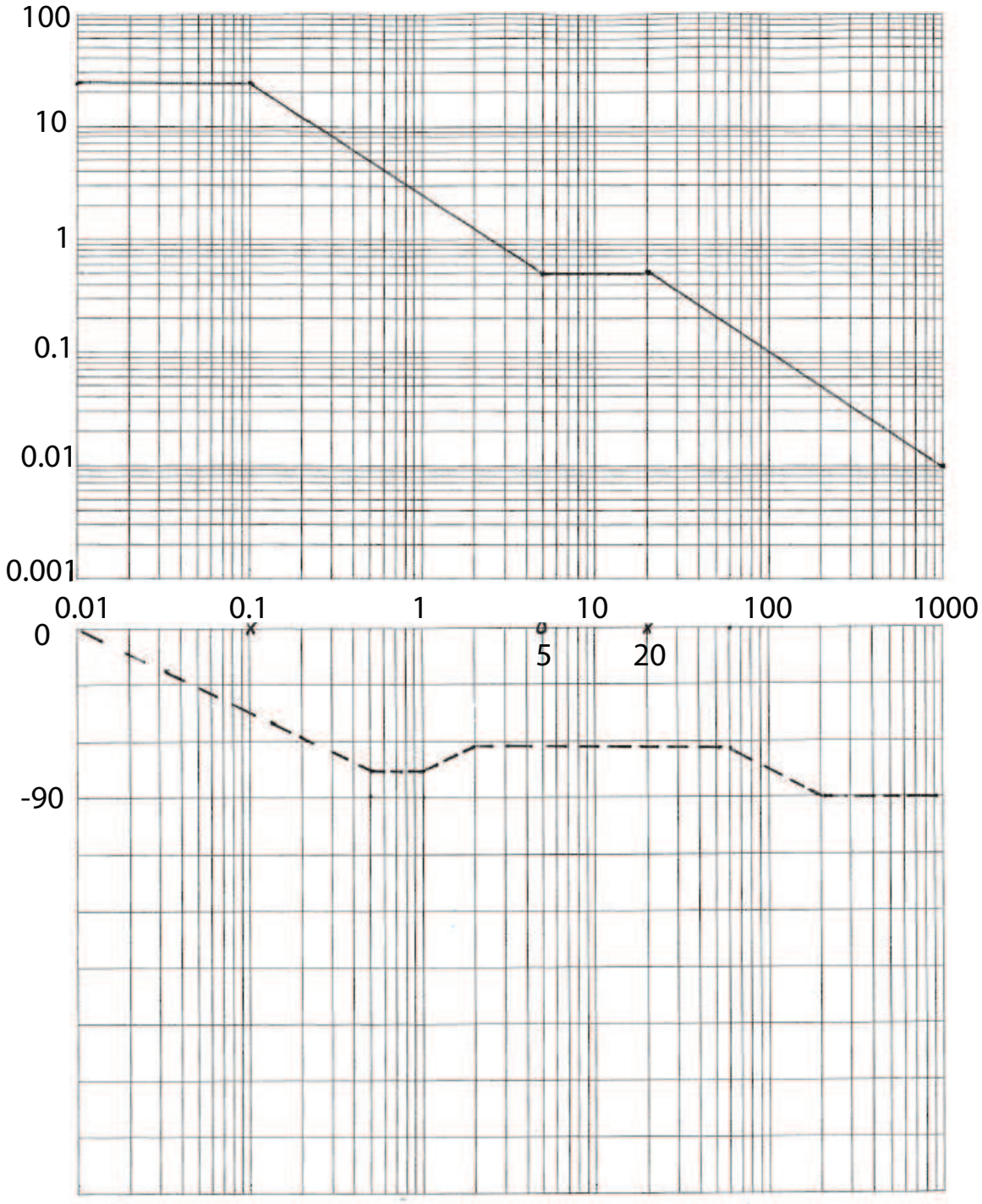
Break Points: pole at 0.1, 20, zero at 5.

(At poles, slope decreases by one, at zeros, slope increases by 1)



Break points are the same for phase.

Start at 0°because $\alpha = 0°$. At poles phase drops 90°, at zeros it increases by 90°. For the phase plot though, we use construction lines to help us draw plot better.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100
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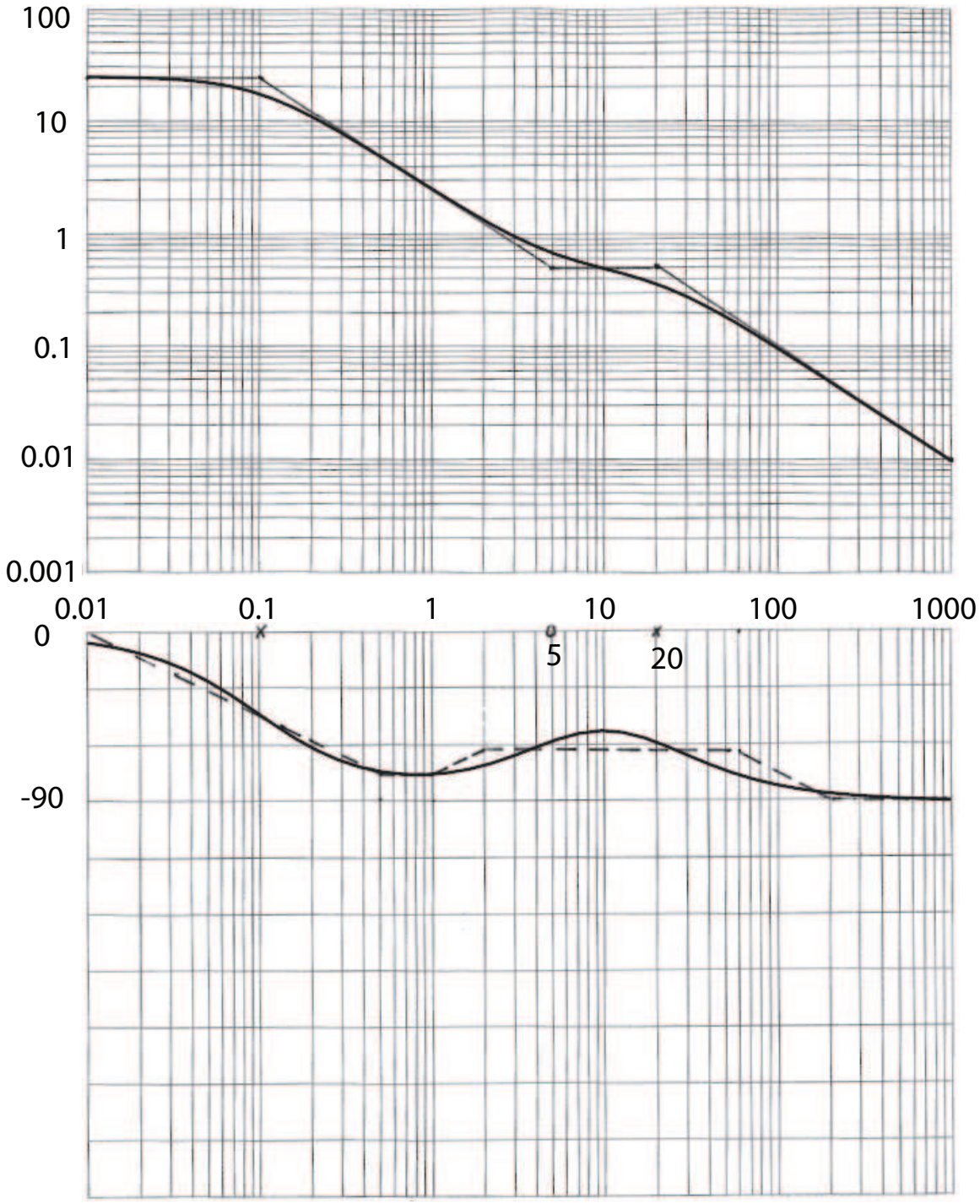
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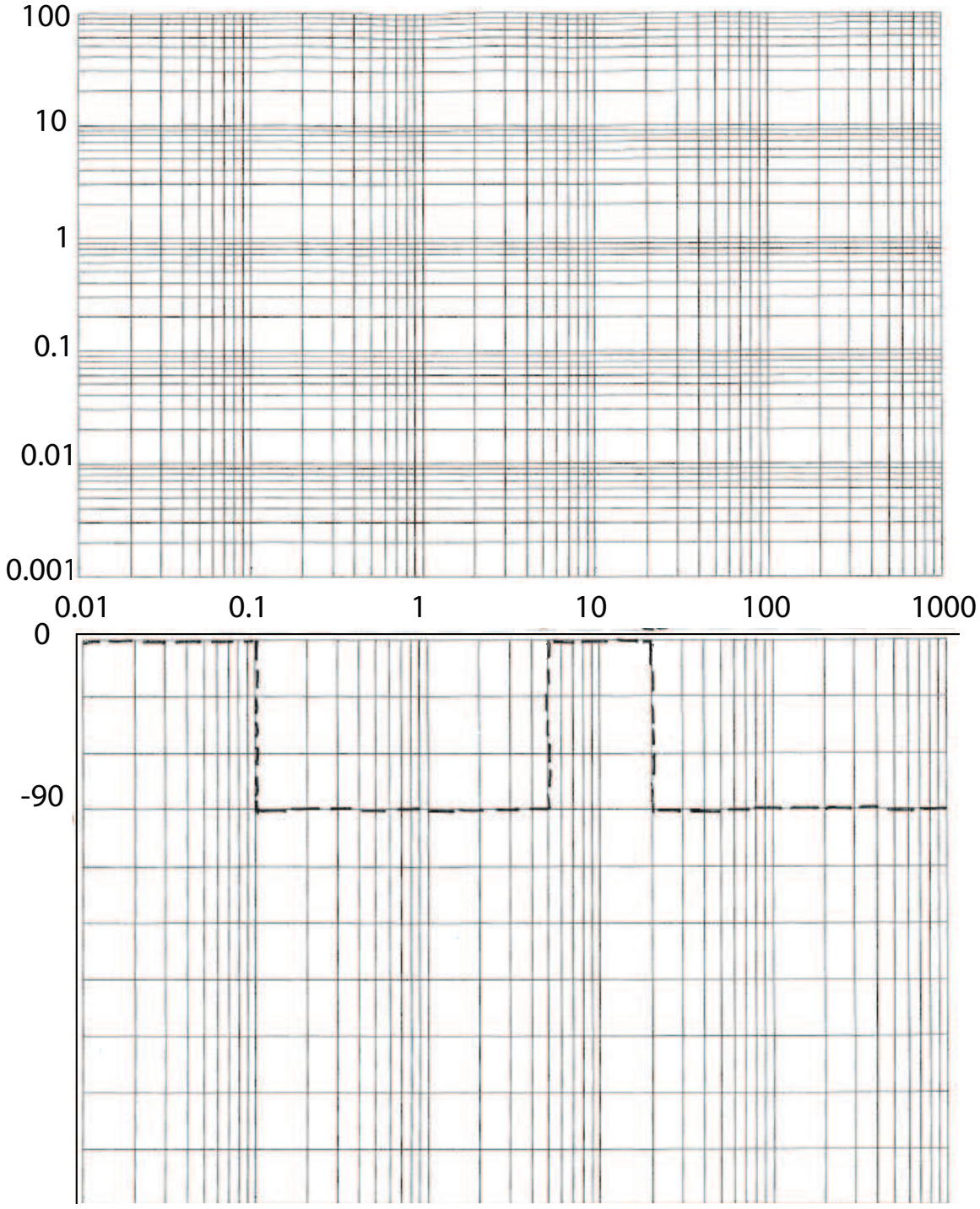
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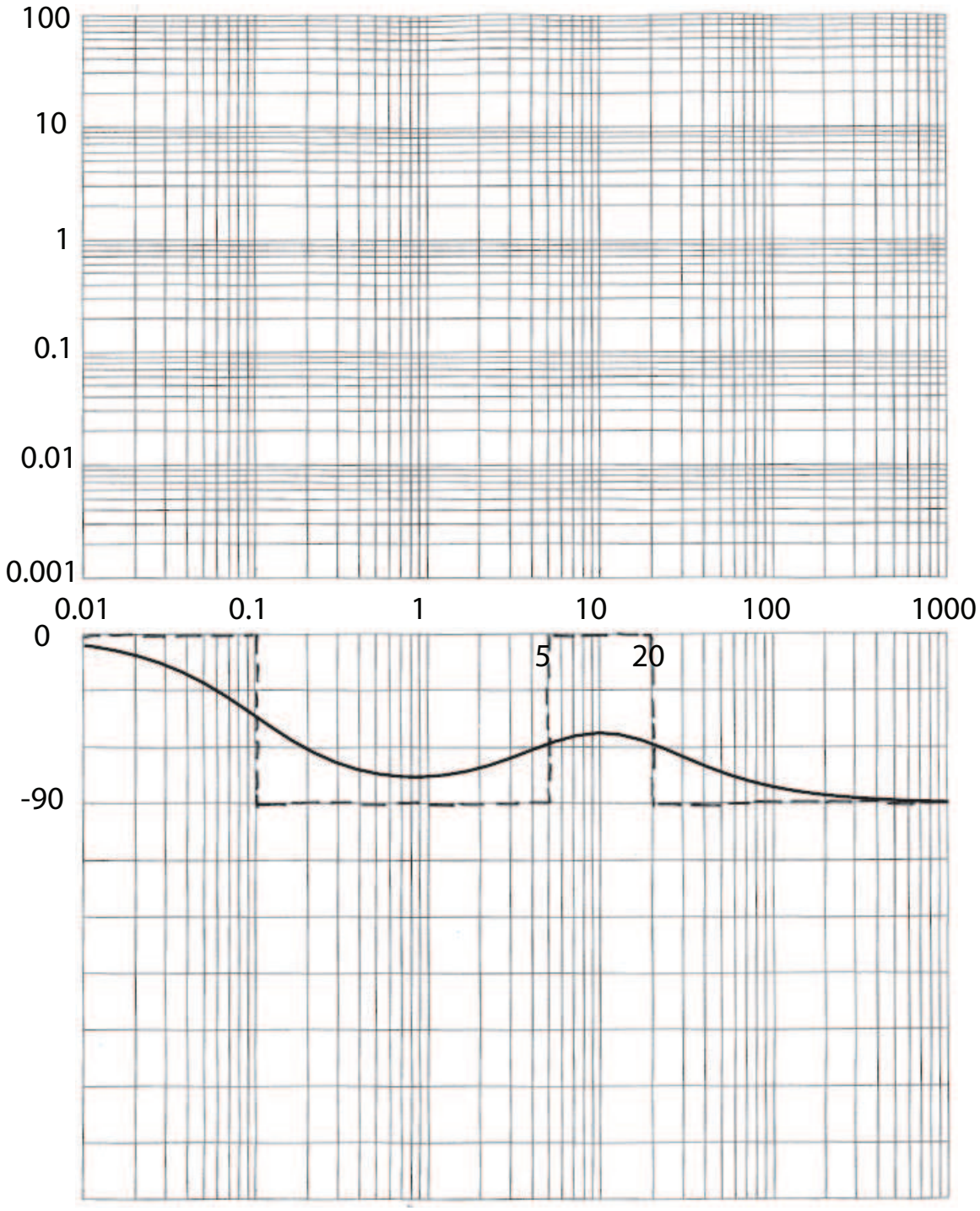
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