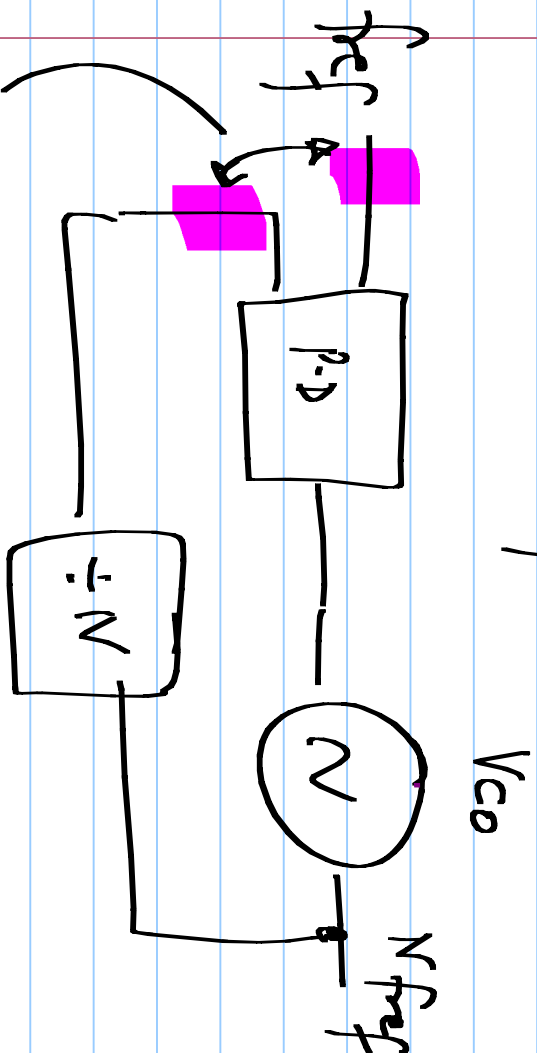


Phase locked loop.



$$\frac{Nf_{ref} - f_o}{K_{VCO} \cdot K_{PD}}$$

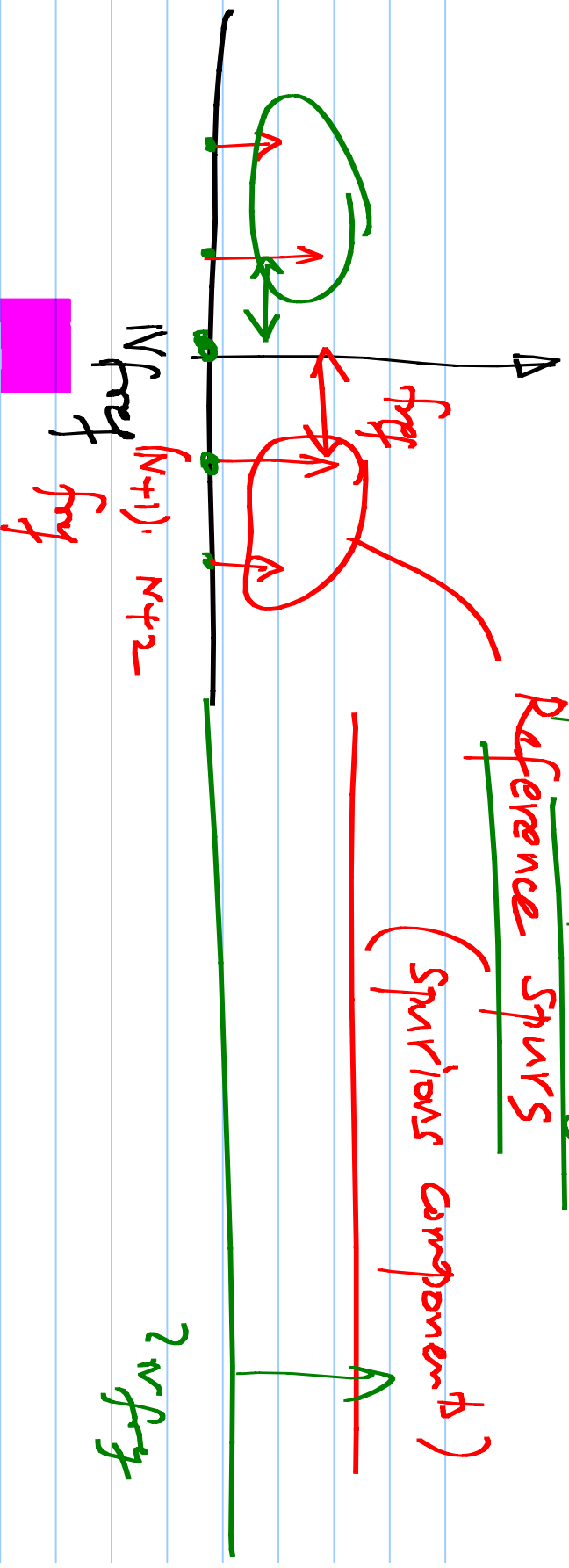
Type-I Vc
freq. error = 0

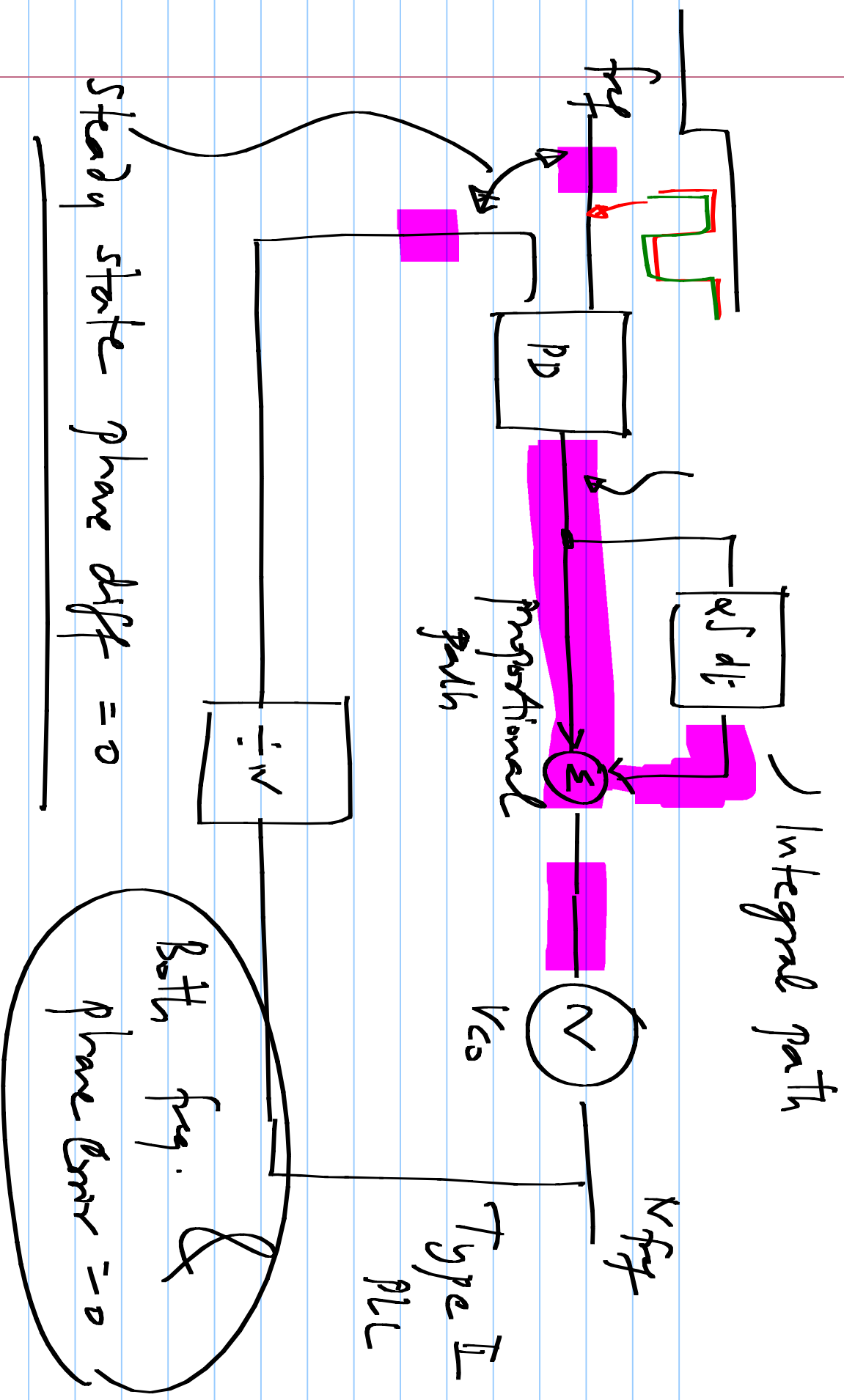
2.2/4/2016

Not enough degrees
of freedom to
set both lock range
and spurious components
to desired values

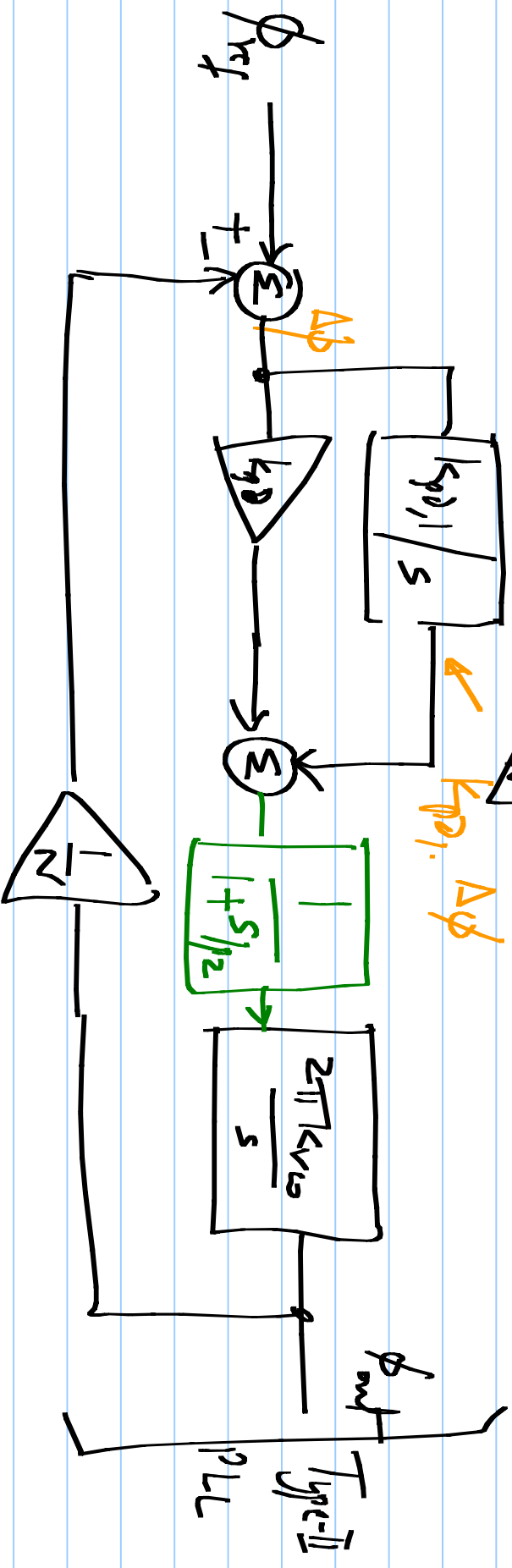
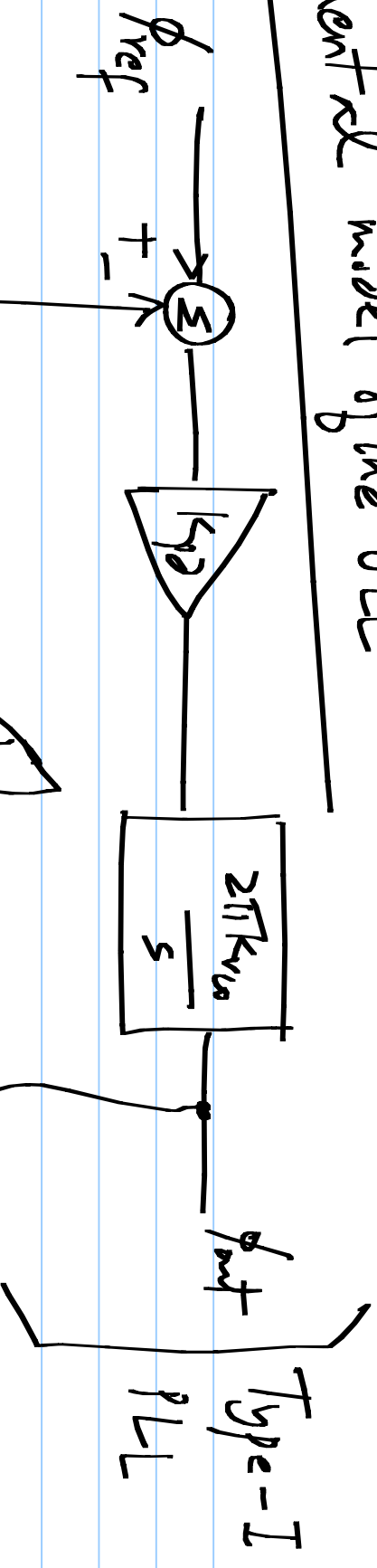
Reference feedthrough
Reference spurs

(spurious components)



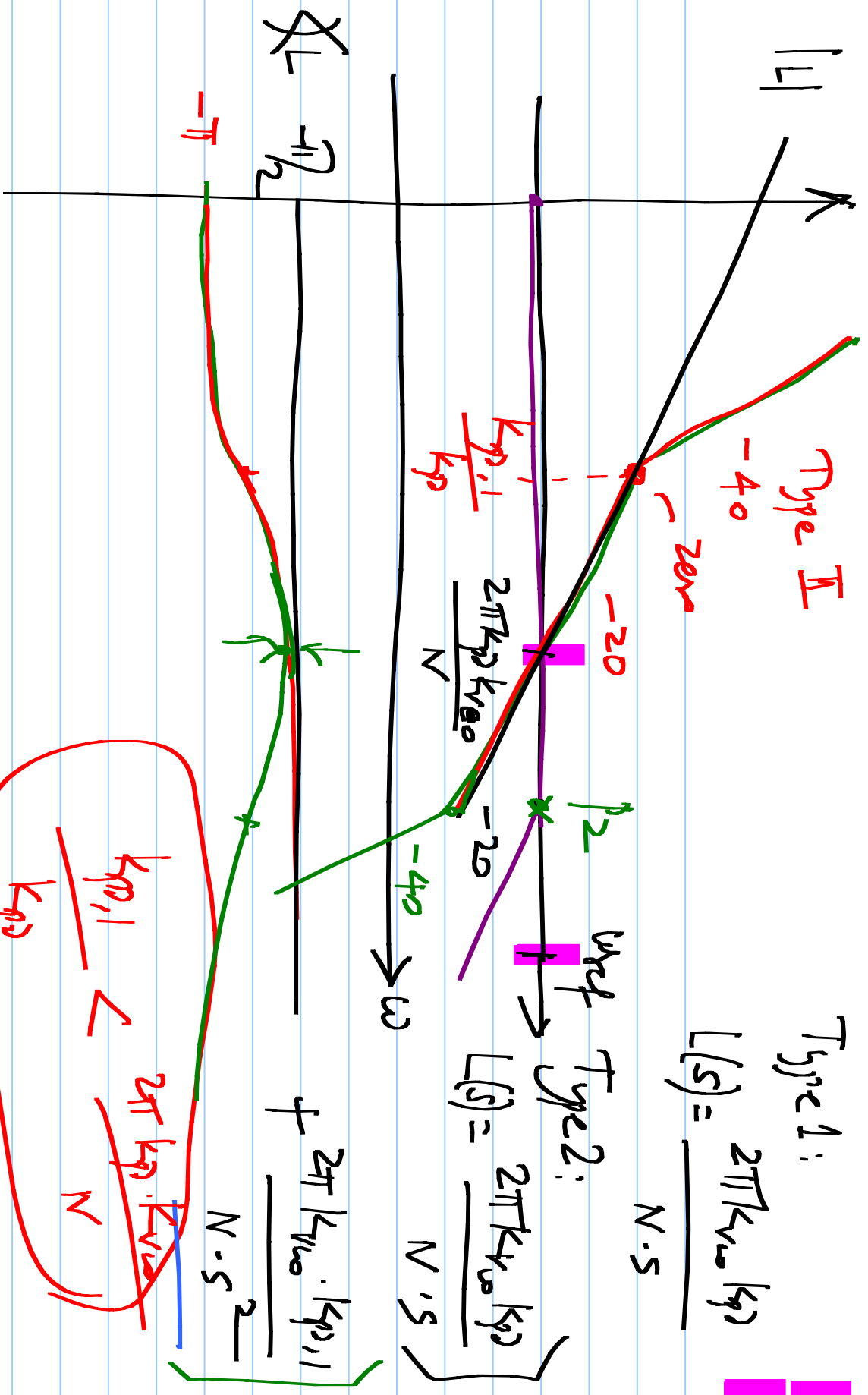


Incremental model of the PLL



Type 1:

$$L(s) = \frac{2\pi K_{v0} k_p}{N \cdot s}$$



② try

ϕ_{in}

