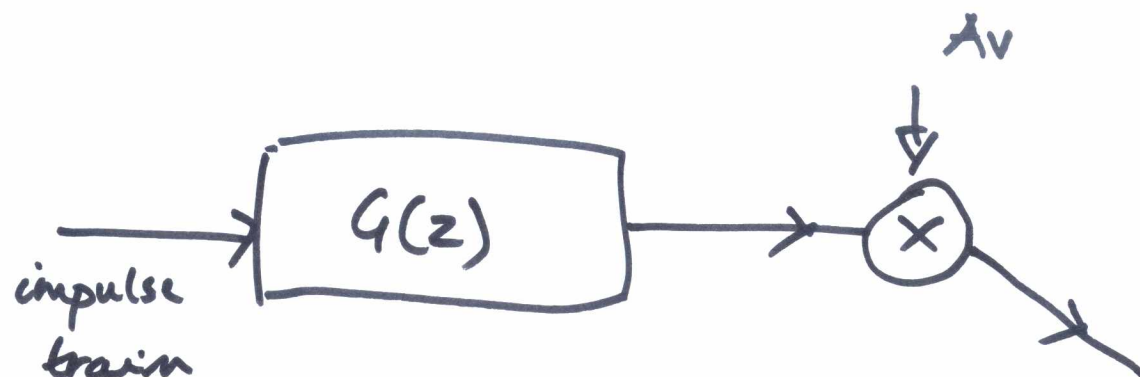


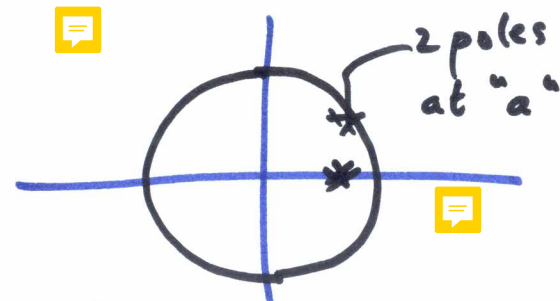


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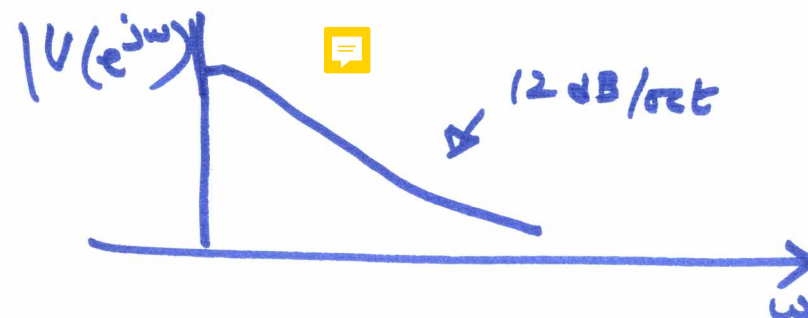
EE679 L 5 / Slide 3



$U(z)$



$$U(z) = \frac{1}{(1 - az^{-1})^2}$$



Vowels :

Cascade model is good  
of 2<sup>nd</sup>-order resonators



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$(F_i, B_i)$

e.g. अ, ए, इ

5 formants  
/

500 Hz, 1500, 2500, 3500, 4500

$F_1$

$F_2$

$F_3$

$$V(z) = \prod_{k=1}^5 \frac{b_{0k}}{1 - a_{1k}z^{-1} - a_{2k}z^{-2}}$$

$$a_{1k}, a_{2k} \sim F_k, B_k$$

$F_1$  : 180 - 750 Hz

$F_2$  : 600 - 2300 Hz

$F_3$  : 1300 - 3100 Hz.