Phone articulation:

Voicing

Manner

Place

CDEEP
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Sonorants

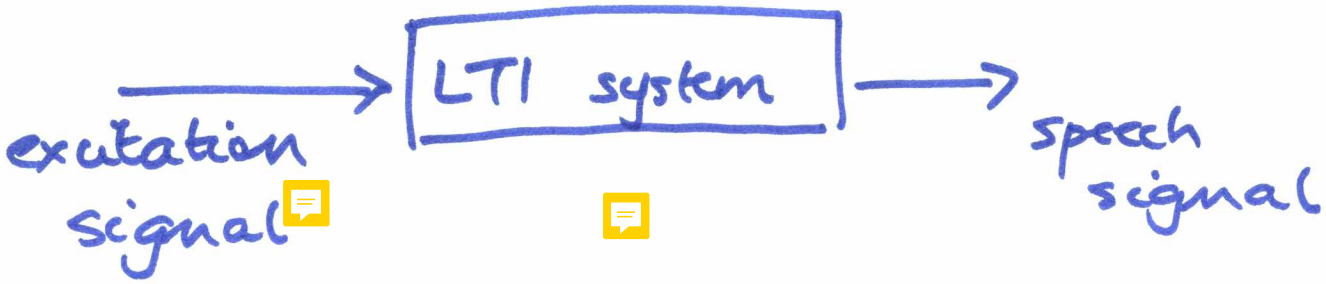
- Vowels
- nasals
- liquids
  Semi-vowels

Obstruents

(V.T. is constricted somewhere)

- Plosives: p, b, d ...
- Fricatives: s, sh, z, f

Source-filter model for speech



$\leftarrow H(e^{j\omega})$; $H(z)$

$$y[n] = x[n] * h[n]$$

$$= \sum_{k=-\infty}^{\infty} h[k]\, x[n-k]$$

Let $x[n] = e^{j\omega n}$

$$\Rightarrow y[n] = \sum_{k=-\infty}^{\infty} h[k] \cdot e^{j\omega(n-k)}$$

$$= e^{j\omega n} \sum_{n} h[n] e^{-j\omega k}$$

$\leftarrow H(e^{j\omega})$

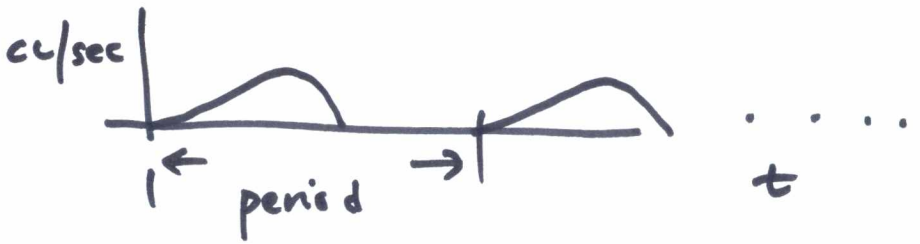
Signal : d-t periodic of period = N samples

$$x[n] = \sum_{k=0}^{N-1} c_k e^{j\frac{2\pi}{N}kn}$$

$$X(e^{j\omega}) = \sum_{k=0}^{N-1} 2\pi c_k \delta\left(\omega - \frac{2\pi}{N}k\right)$$

ω

$c_k H(e^{j\frac{2\pi}{N}k})$ $\qquad$ $H(e^{j\omega})$



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