Spectral-based Sound Transformations

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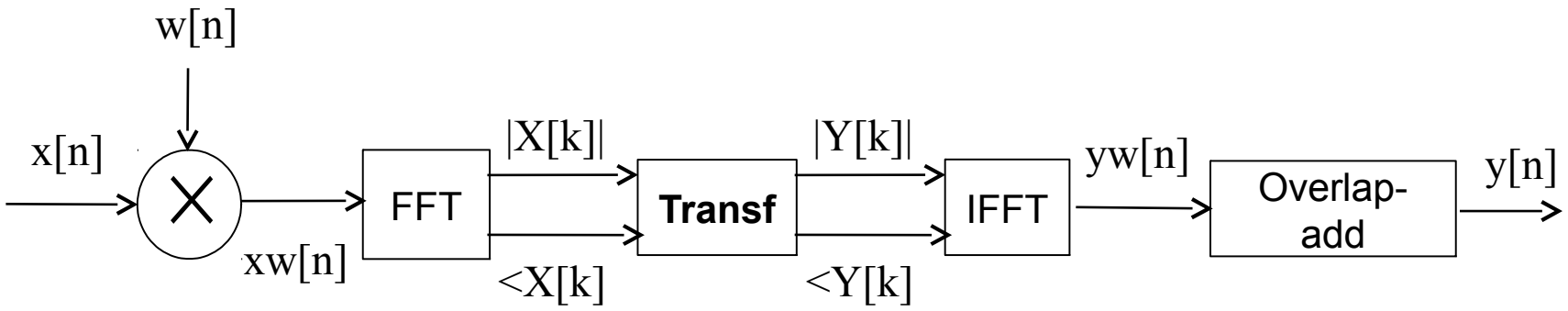
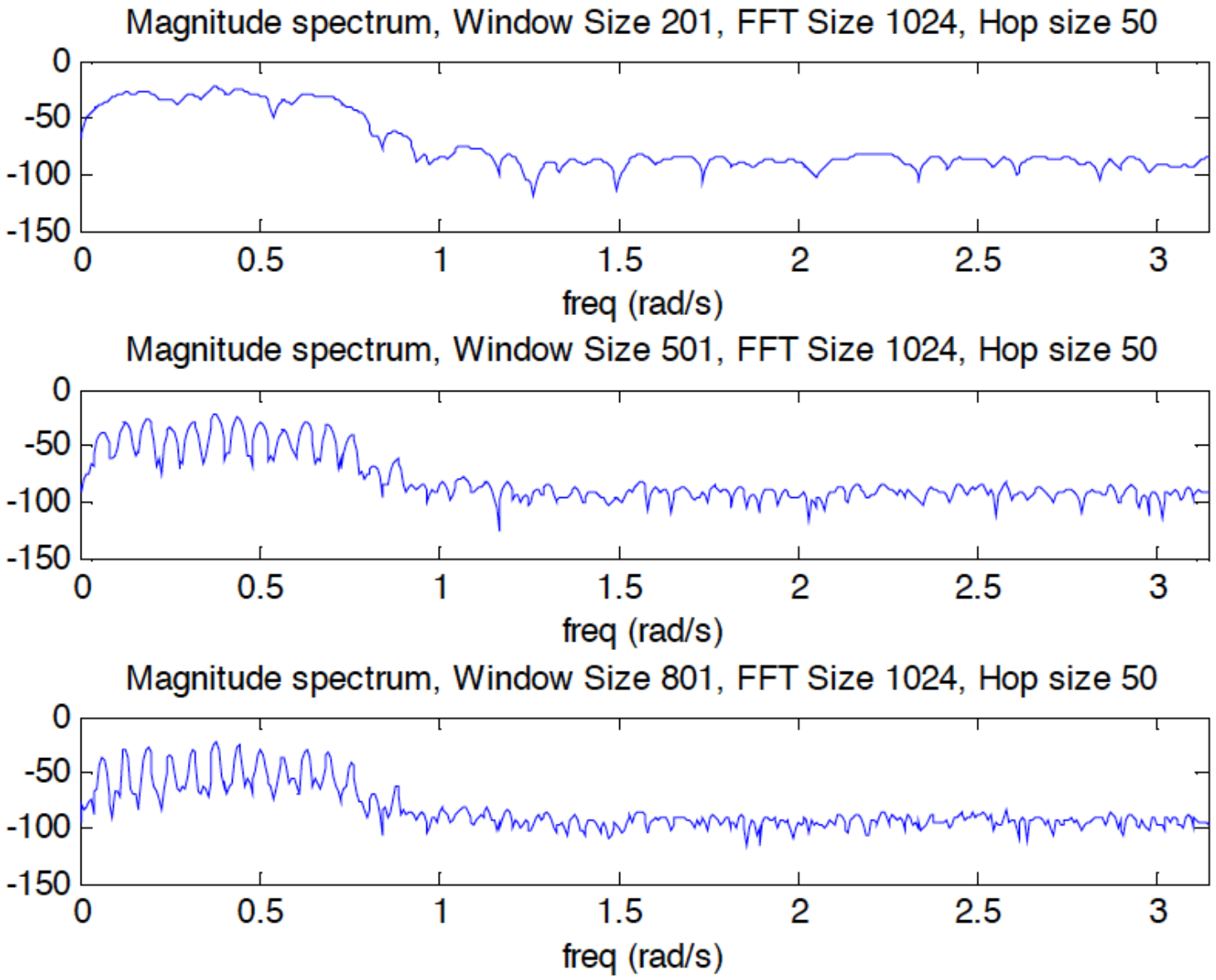
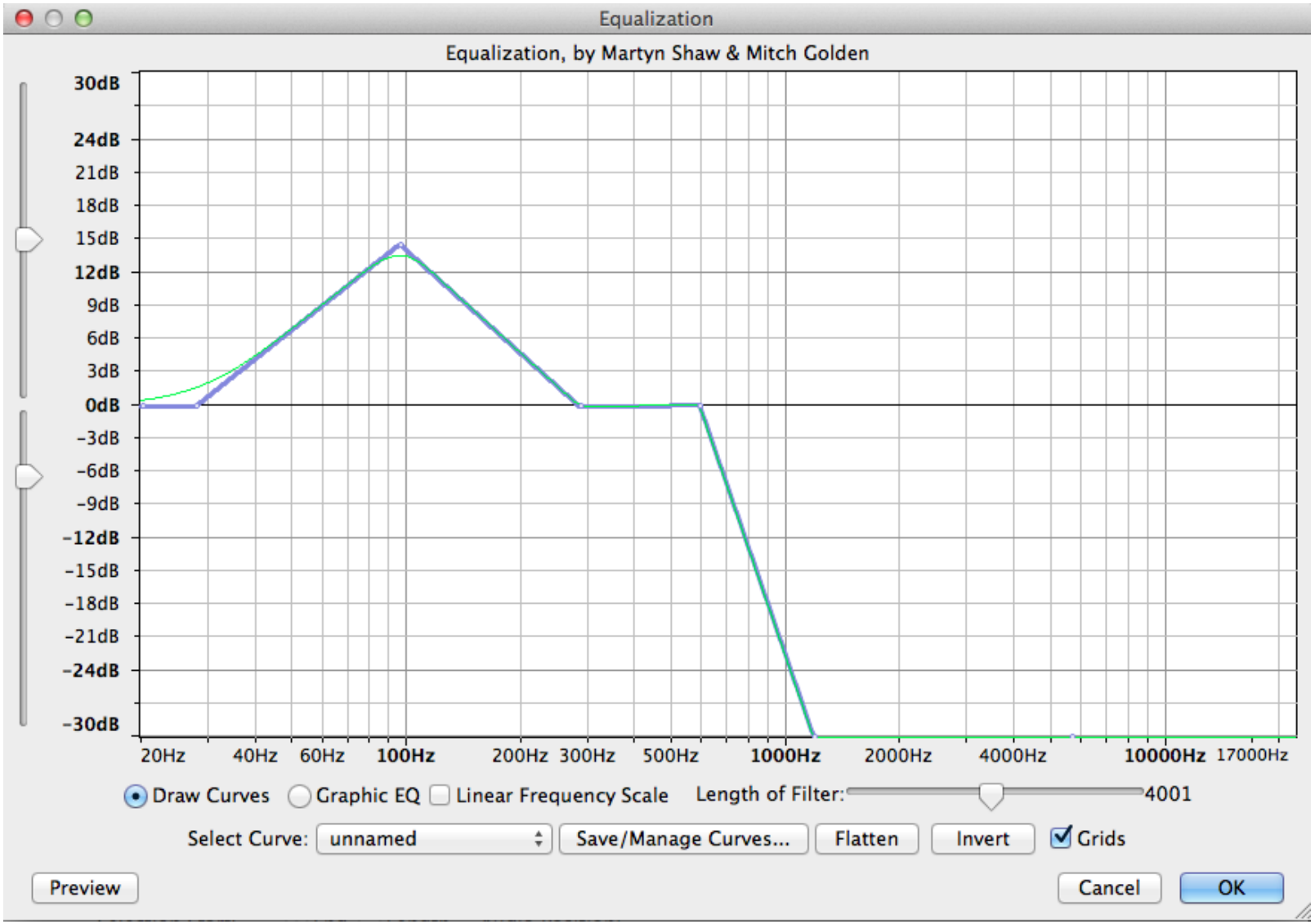
Short-time Fourier transform



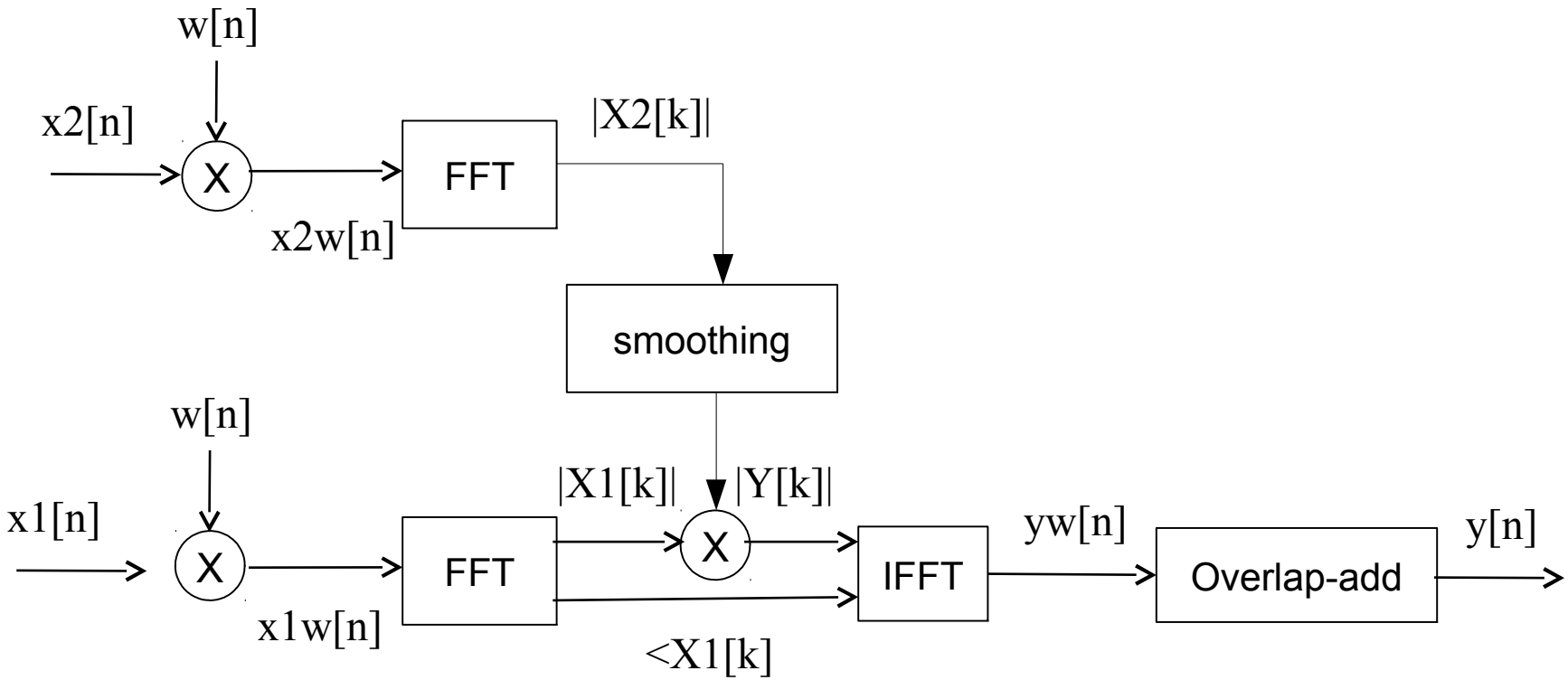
Filtering: frequency resolution



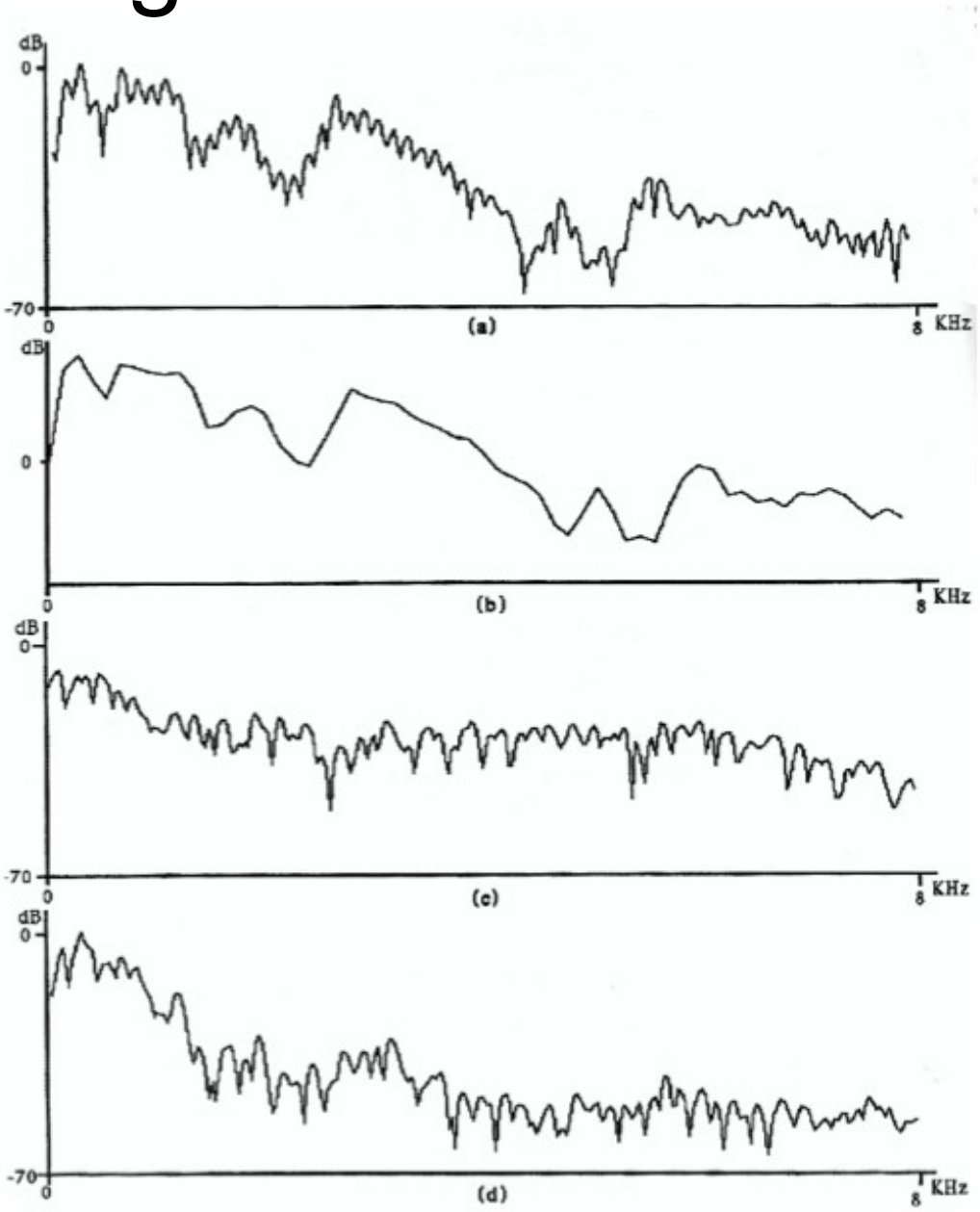
Filtering: Equalization



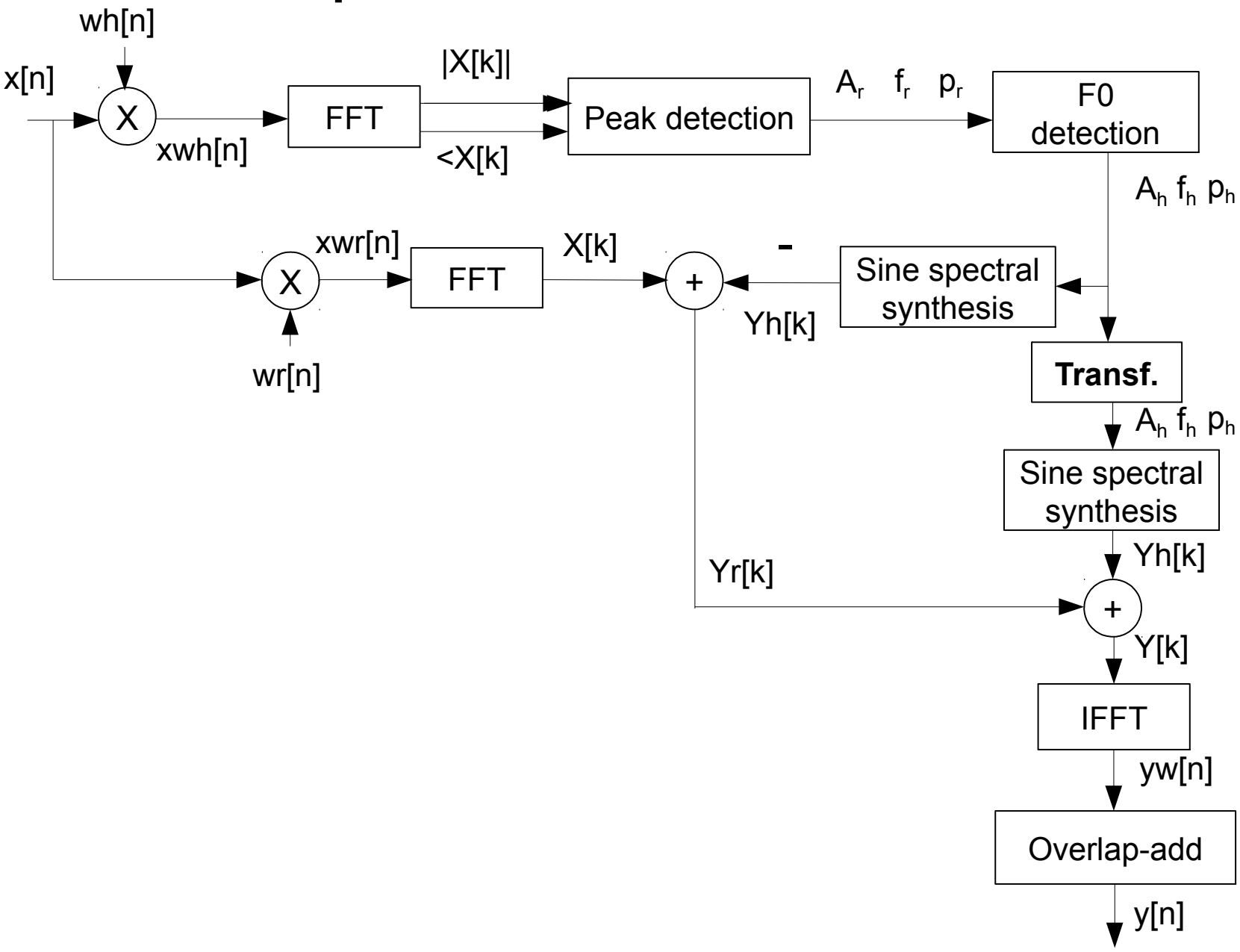
Morphing with STFT



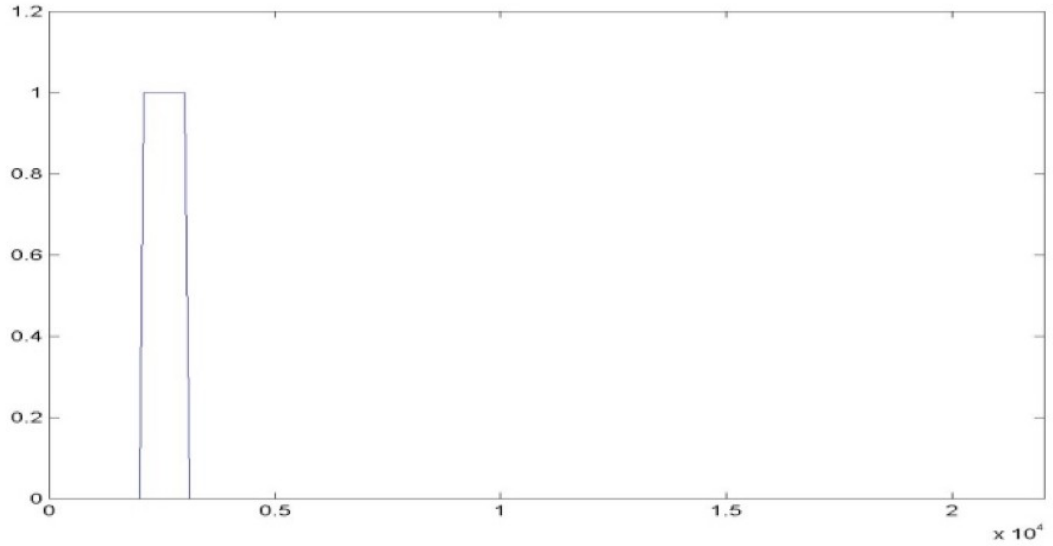
Morphing



Harmonic plus residual model

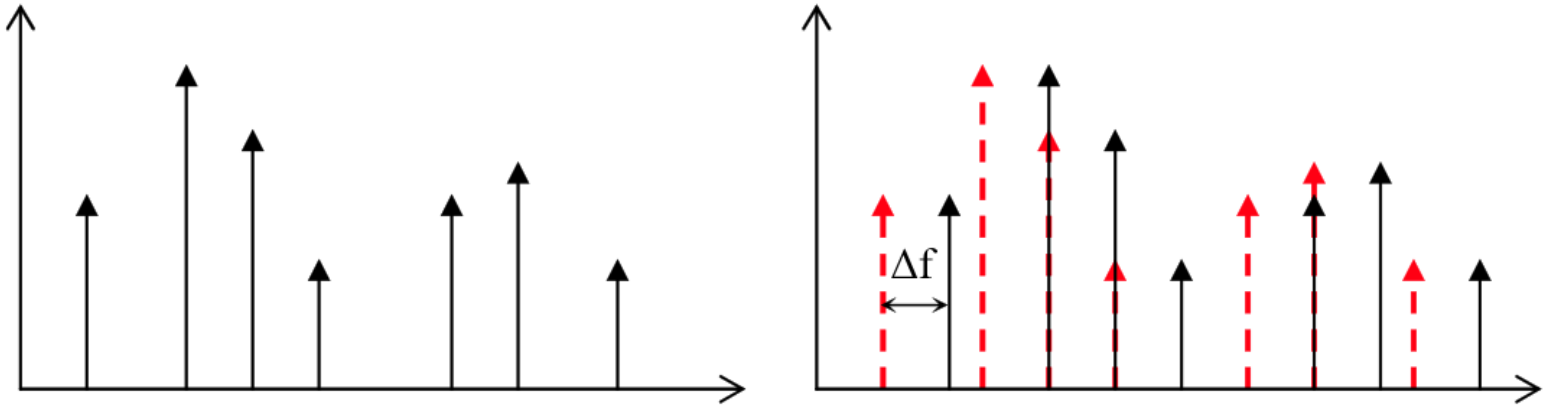


Filtering sine waves



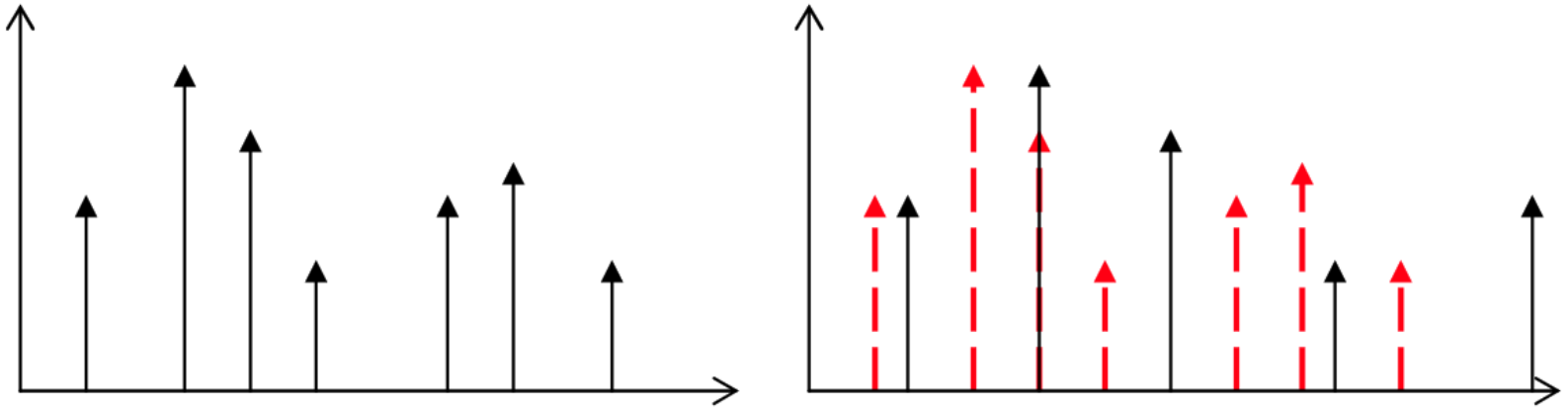

```
Hz = np.array([0, 2099, 2100, 3000, 3001, fs/2]) # Hz
dB = np.array([-200, -200, 0, 0, -200, -200])    # dB
Filter = np.asarray((Hz, dB))
ysmag += np.interp(ysloc/Ns*fs, Filter[0,:],Filter[1,:])
```

Frequency shifting of sine waves



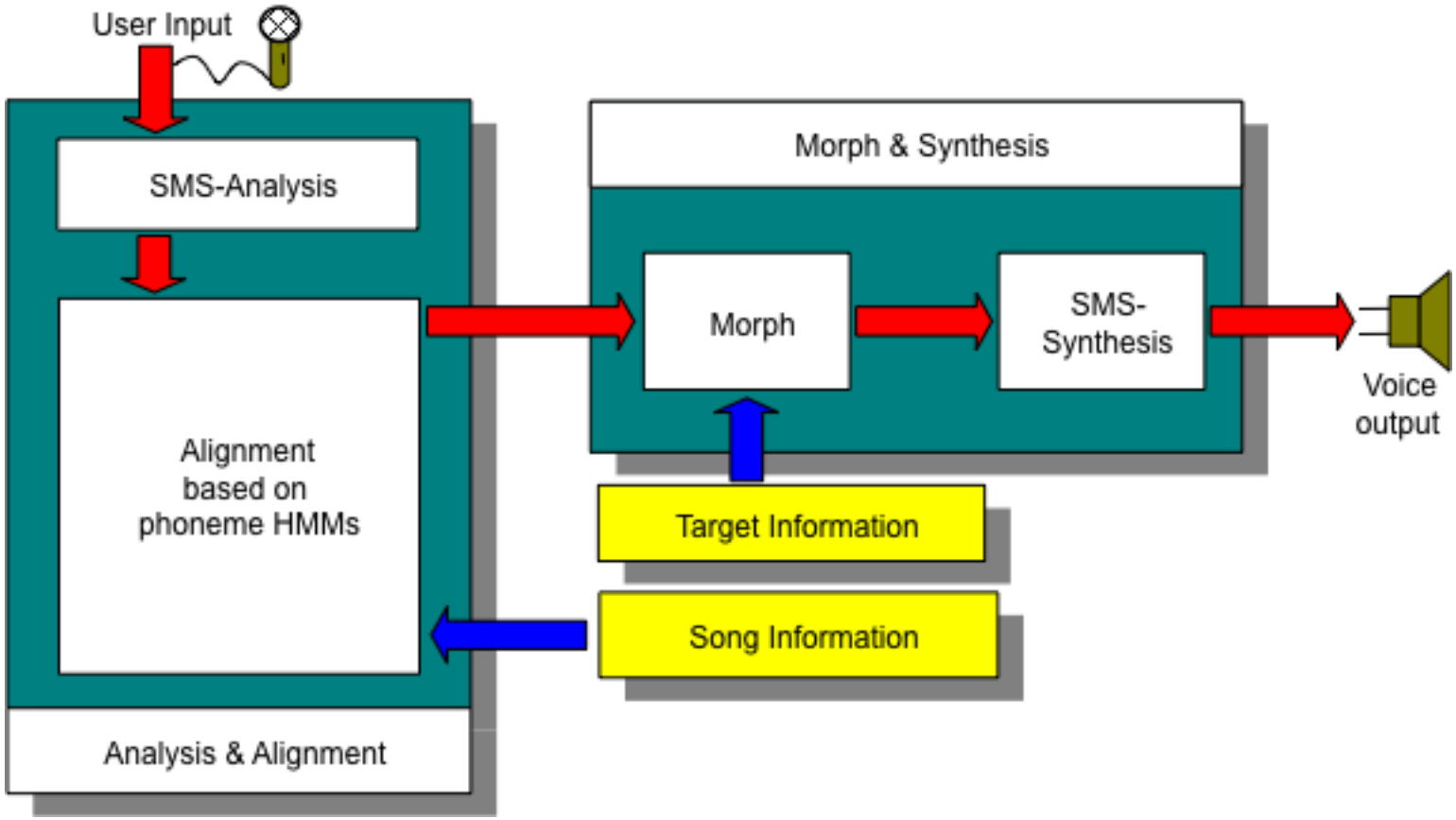
fshift = 100.0
ysloc = (ysloc>0) * (ysloc + fshift/fs*Ns)

Frequency stretching of sine waves

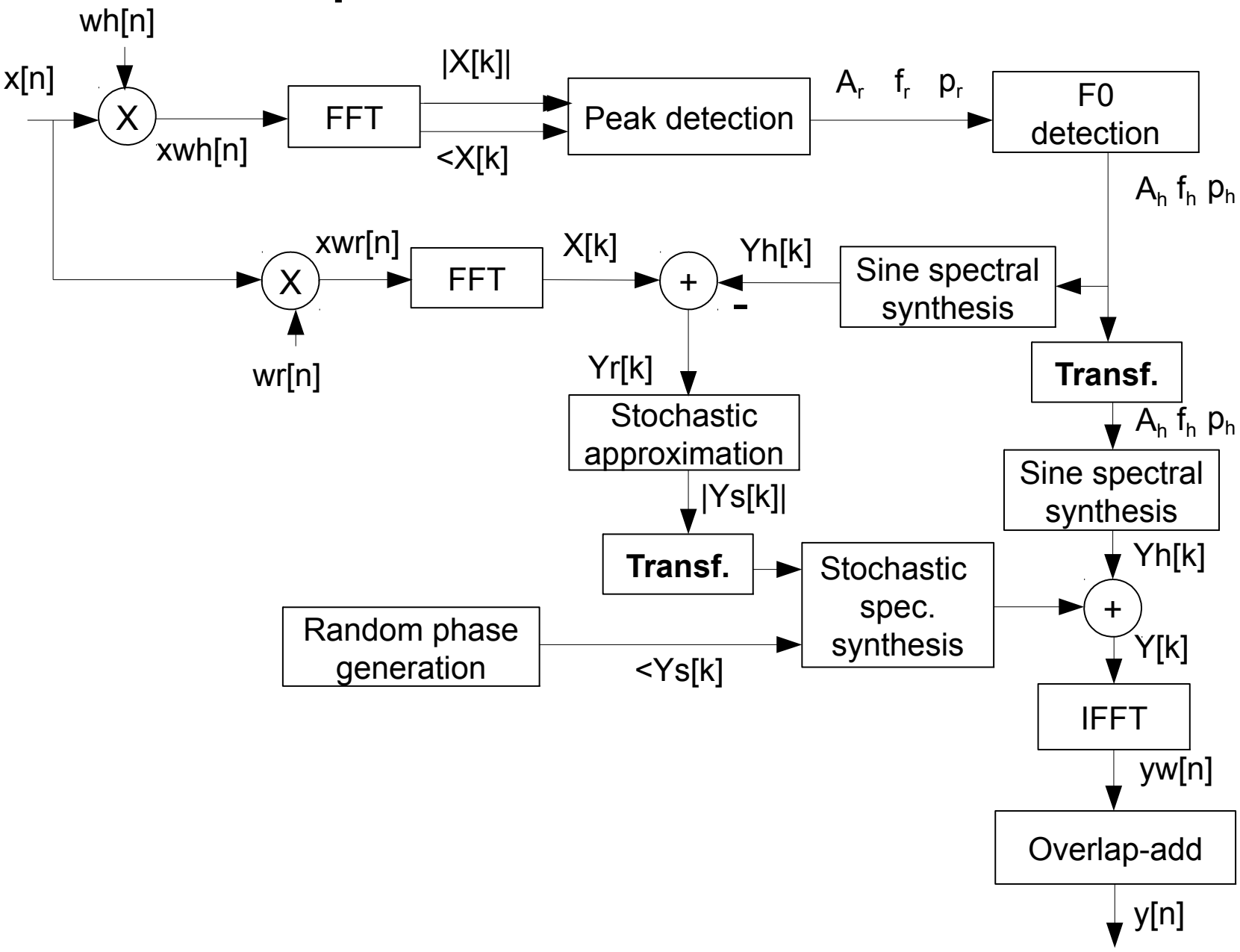


```
fstretch = 1.1
ysloc = ysloc * (fstretch**np.arange(0, ysloc.size))
```

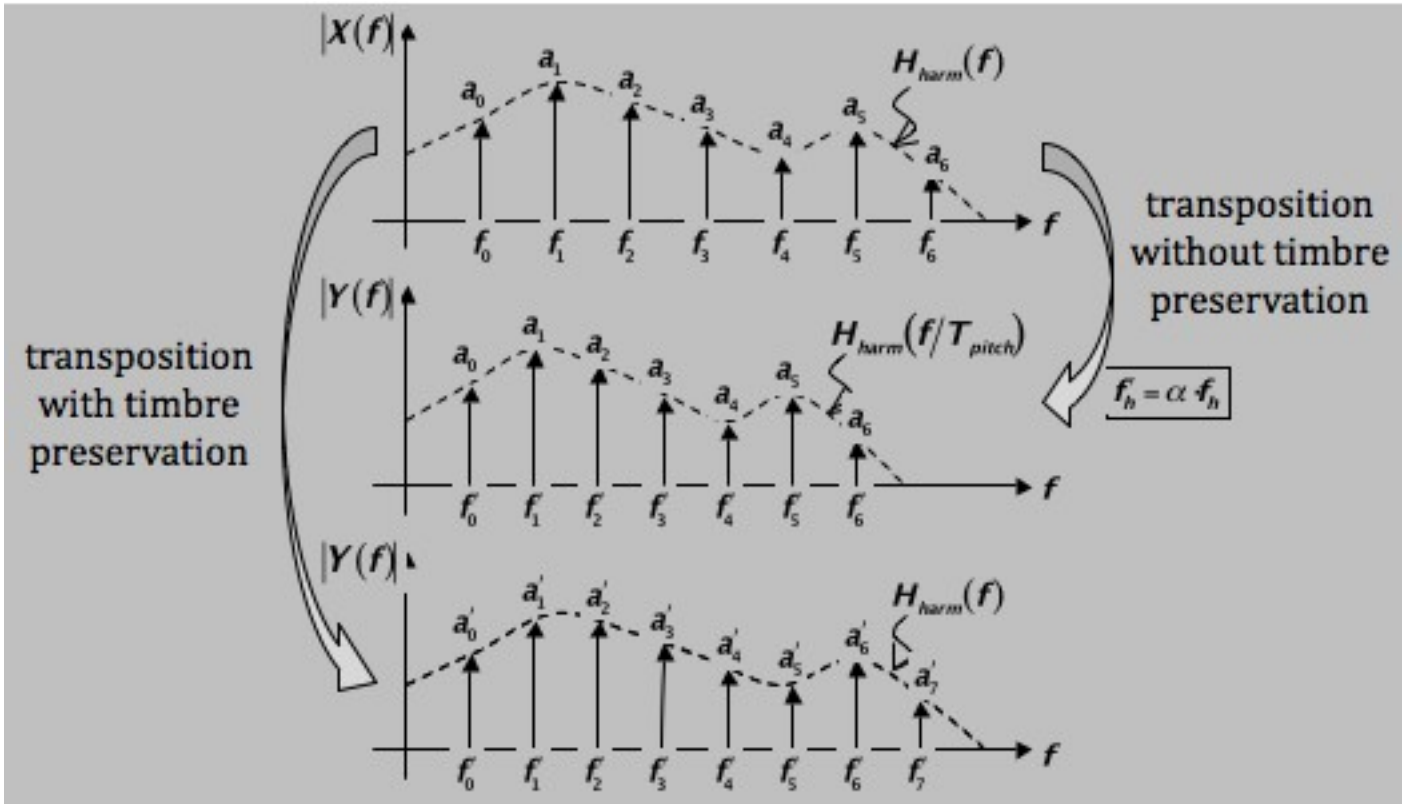
Morphing


User Input
SMS-Analysis
Alignment based on phoneme HMMs
Analysis & Alignment
Morph & Synthesis
Morph
SMS-Synthesis
Voice output
Target Information
Song Information

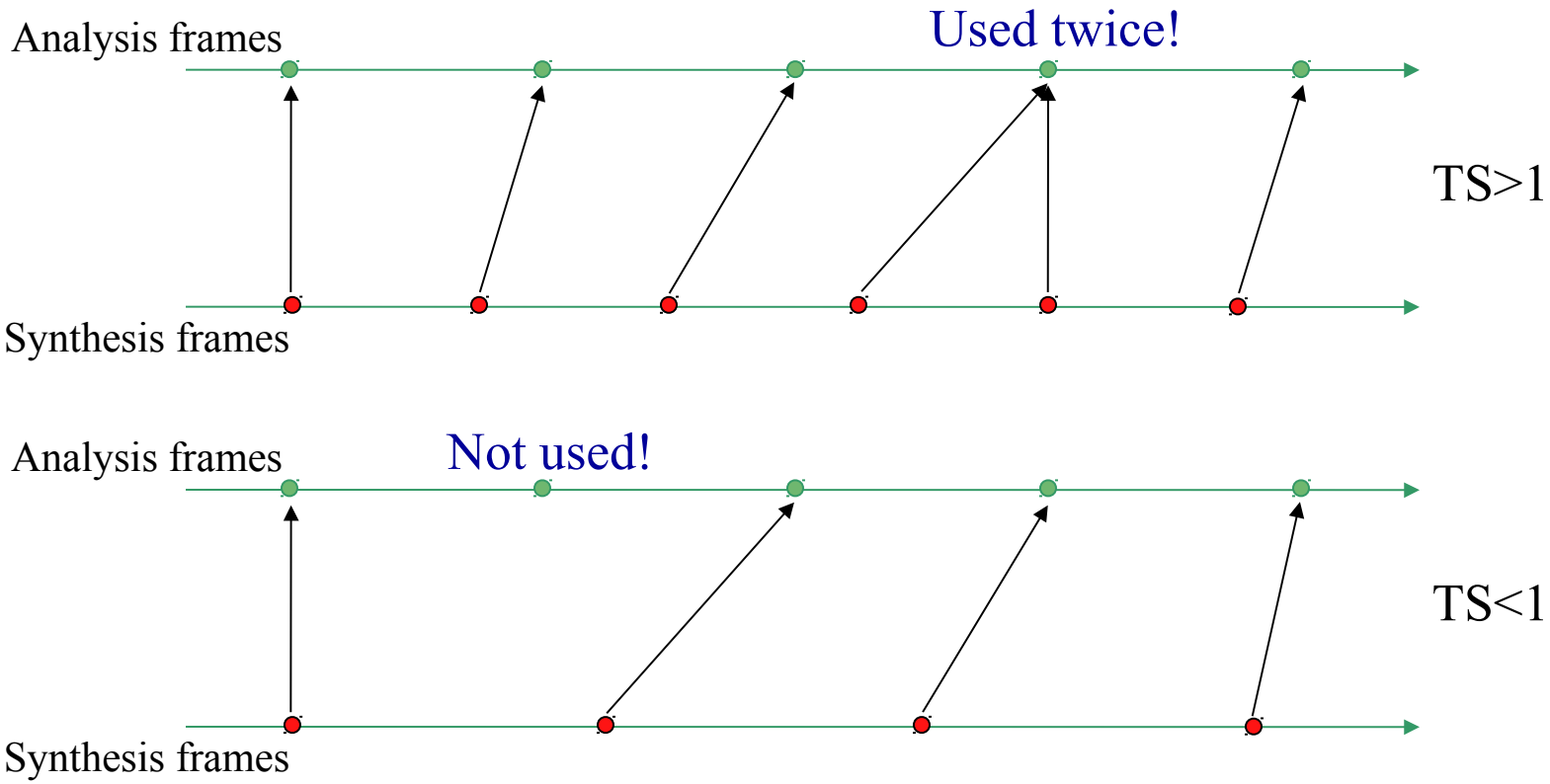
Harmonic plus stochastic model



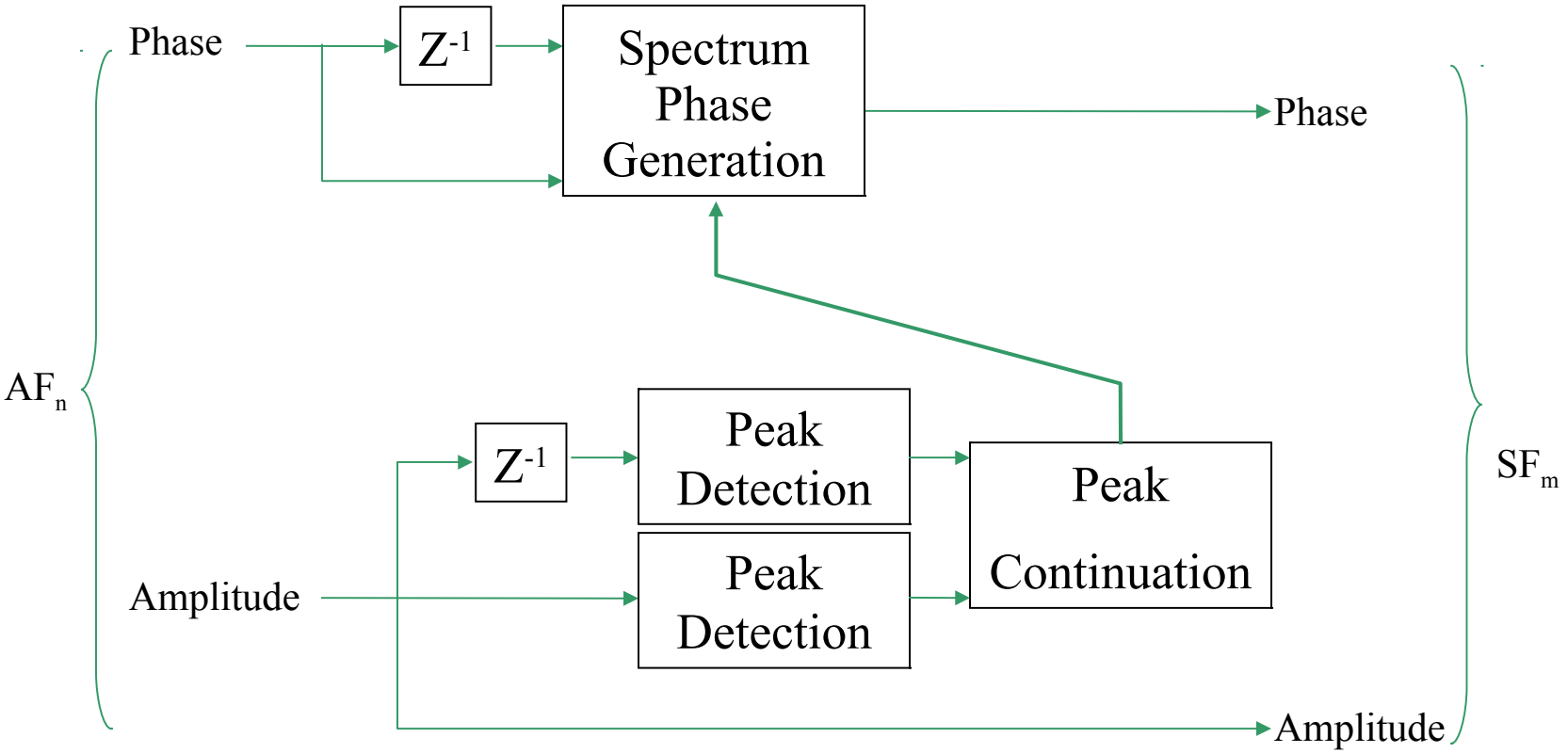
Pitch transposition with timbre preservation



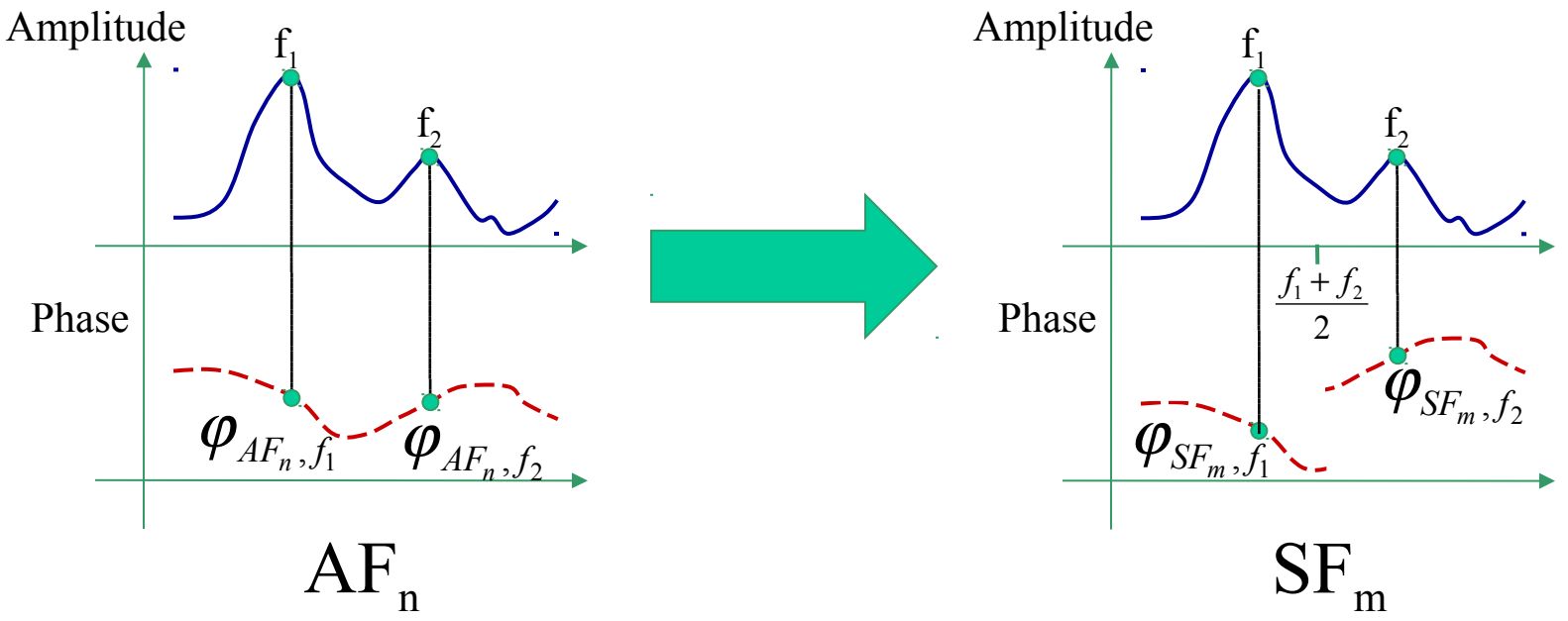
Time scaling



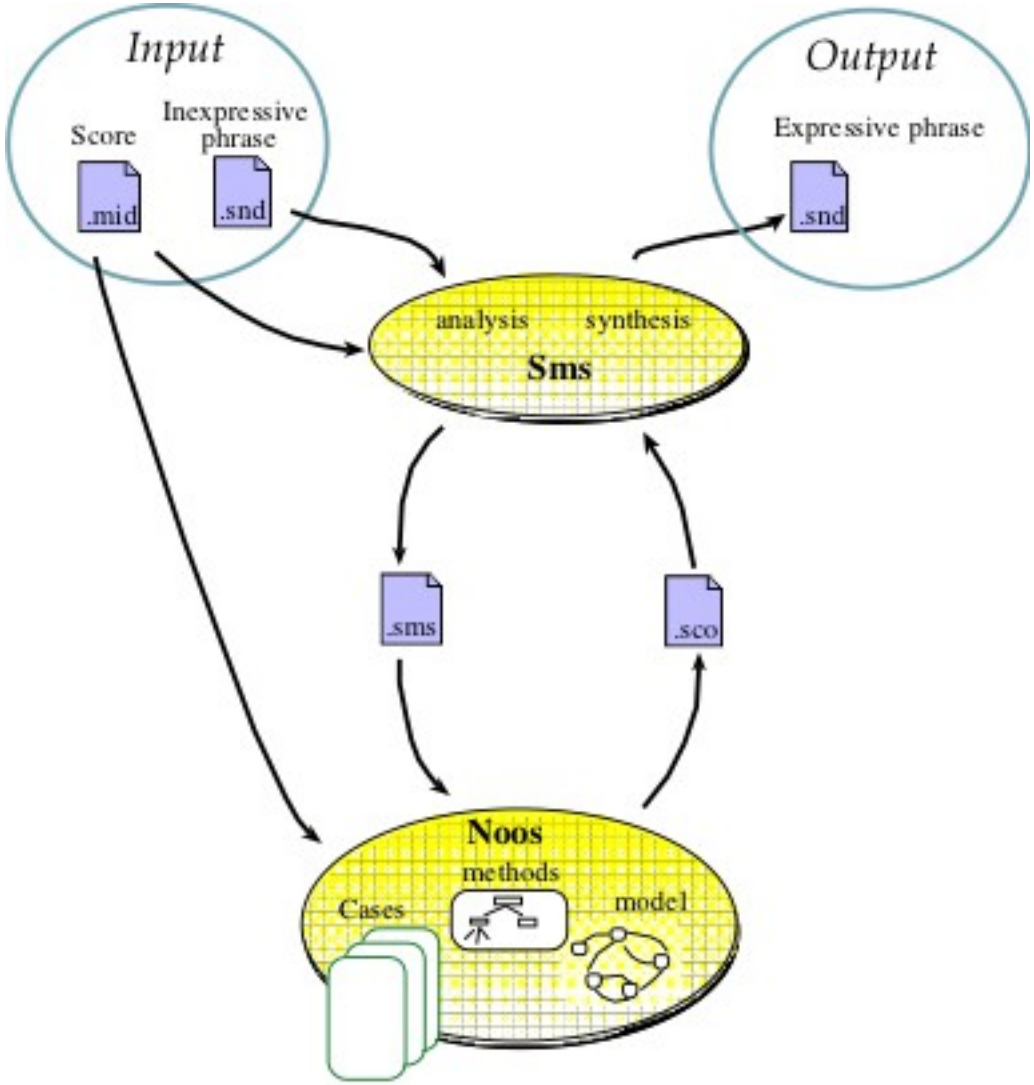
Time scaling: phase preservation



Phase preservation around each peak



Expressive transformations



References

- http://en.wikipedia.org/wiki/Sound_effects
- http://en.wikipedia.org/wiki/Equalization_filter
- http://en.wikipedia.org/wiki/Audio_timescale-pitch_modification

Credits