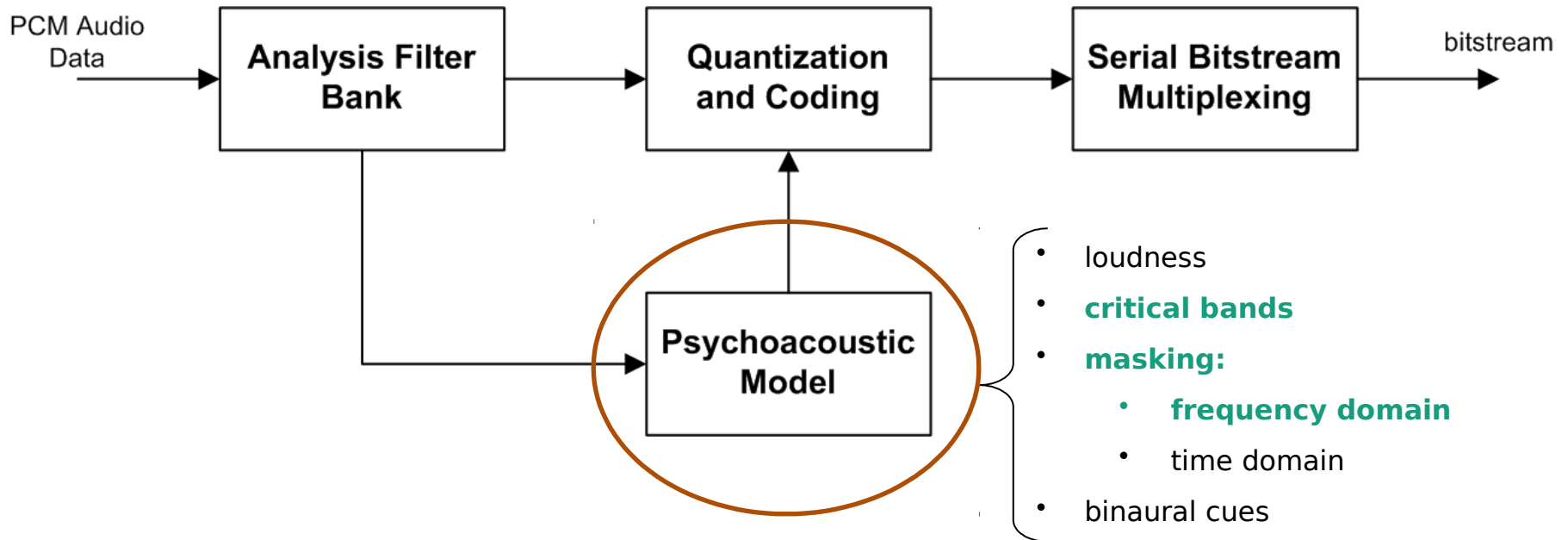

Audio Coding - Practice Lessons

Seminar 2 - Perceptual Model / Masking

Perceptual Audio Encoder



Homework Assignment 2

Goal: Using the Psychoacoustics model reduce the amount of audible quantization noise.

Step 1:

- Generate a signal consisting of two sinusoids:
 - i. Sin_1 - 200 Hz
 - ii. Sin_2 - 600 Hz
 - iii. Signal duration - 3 min, Sampling rate - 44100
- Apply STFT to the signal (1024 subbands)

Homework Assignment 3

Goal: Using the Psychoacoustics model reduce the amount of audible quantization noise.

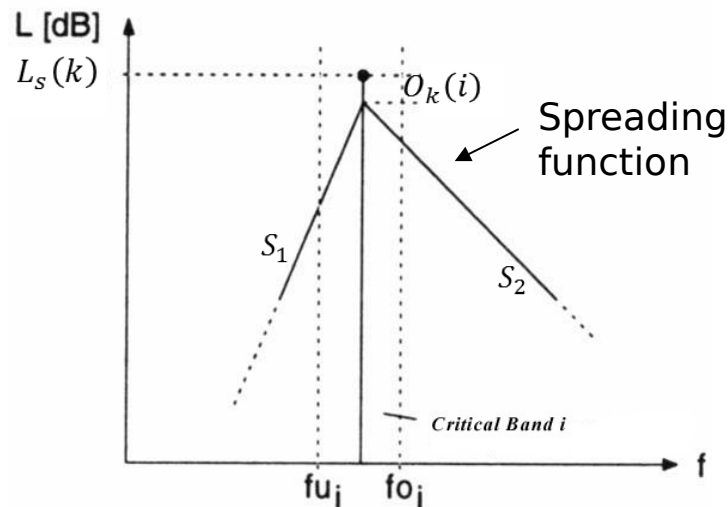
Step 2:

- Transformation from STFT to Bark scale
 - For the input to the psycho-acoustic model, group the STFT subbands into groups of **width of 1/2 Bark**
 - Use the function of frequency to Bark for it
 - Within each group, add the powers (squares of the values) of the subbands

Homework Assignment 3

Step 2:

- Spreading function
 - Compute the spreading function, centered on each group
 - Observe that each spreading function extends over all other bark groups.



Source: U. Zölzer, "Digital Audio Signal Processing"

Homework Assignment 3

Step 3:

- Masking threshold
 - Then add up the contributions of all spreading functions within each 1/2 Bark group.
 - This now is our masking threshold as a power, T^2
 - This should be equal to our quantization error power, $T^2 = \frac{\Delta^2}{12}$ with quantization step size Δ .
- Include the plots of:
 - Spectrum of the signal
 - Magnitude Spectrum mapped to 1/2 Bark Bands
 - Masking Threshold in Bark Domain
 - Masking Threshold back in Linear Domain
 - Masking Threshold including Threshold in Quiet for our signal