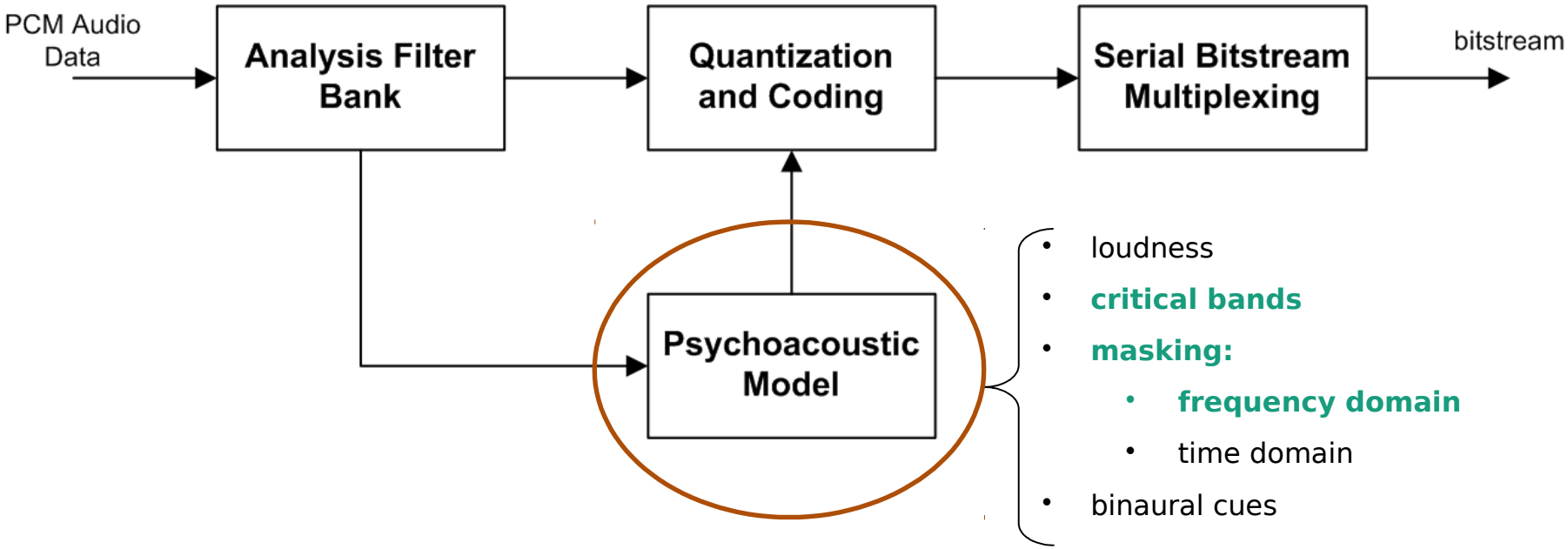
Audio Coding - Practice Lessons

Seminar 3 – Perceptual Model / Masking

Perceptual Audio Encoder



Homework Assignment 3

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

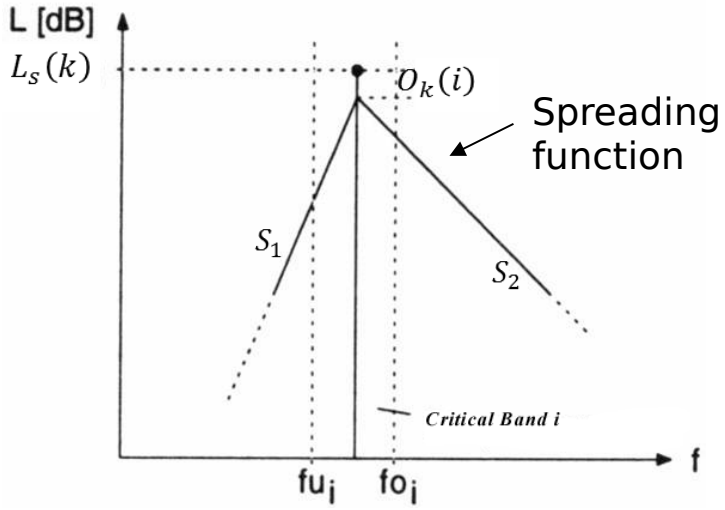
Step 1:

- Transformation from MDCT to Bark scale
  - For the input to the psycho-acoustic model, group the MDCT 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_i^2.
  - This should be equal to our quantization error power, $T^2 = \frac{\Delta^2}{12}$, with quantization step size Δ .

Homework Assignment 3

Step 4:

- Quantization step size
  - Take this Δ as quantization step size, and apply it to the quantizers for the MDCT subbands in the corresponding 1/2 Bark group.
  - Do this calculation for each block such that the Masking Threshold can follow the signal