S-72.245 Transmission Methods in Telecommunication Systems
Tutorial 8: Review

Topics

- Effect of interference in analog demodulation
- Preemphases and deemphases filtering
- Topics in PLL
- PAM PSD
- Tapped delay equalization
- Eye diagram

Quizzes

Q8.1 Compare the results of interference analysis to the results of noise in post detection SNR - conclusions?

Q8.2 Why preemphases and deemphases filtering is used? Could they be used to improve SNR of AM demodulation? Why or why not?

Q8.3 Sketch a block diagram of a PLL that generates smaller frequencies than the frequency it is locked. Suggest a circuit to realize the required multiplier!

Q8.4 Explain how Costas-loop works - Could it be used to detect SSB signals? Why or why not?

Q8.5 Inspect the following PAM PSD expression

$$G_x(f) = \sigma_a^2 r \left|P(f)\right|^2 + m_a^2 r^2 \sum_{n=-\infty}^{\infty} \left|P(nr)\right|^2 \delta(f - nr)$$

Comment its usage in system design!

Matlab assignments

M8.1 Generate a tone-modulated FM signal and an interfering tone that is injected to the noiseless FM-demodulator input (freely selectable parameters). Create verifying graphs to yield qualitative proof of the interference behavior discussed in the lecture slides!