| | **Projects for the subject Digital Filters (year 2007)** | **Students** |
|---|---|---|
| 1. | **Design and implement Finite Infinite Impulse Response (FIR) and Infinite Impulse Response (IIR) pass-band digital filters with the following parameters (requirements):**<br>**1. pass-band edge frequencies 4 kHz and 6 kHz**<br>**2. stop-band frequencies 3 kHz and 7 kHz**<br>**3. sampling frequency is 48 kHz**<br>**4. maximal allowed pass-band ripple is 0.1 dB**<br>**5. stop-band attenuation must be at least 60 dB**<br>**6. use minimal number of filter coefficients and optimize it for 16-bit fixed point DSP implementations by using proper scaling and pole-zero pairing.**<br>**Design complete filter in Matlab environment. For hardware testing use IIR implementation based on cascade of second-order sections.** | Šimku |
| 2. | **Design and implement Finite Infinite Impulse Response (FIR) and Infinite Impulse Response (IIR) stop-band digital filters with the following parameters (requirements):**<br>**1. pass-band edge frequencies 3 kHz and 7 kHz**<br>**2. stop-band frequencies 4 kHz and 6 kHz**<br>**3. sampling frequency is 48 kHz**<br>**4. maximal allowed pass-band ripple is 0.1 dB**<br>**5. stop-band attenuation must be at least 60 dB**<br>**6. use minimal number of filter coefficients and optimize it for 16-bit fixed point DSP implementations by using proper scaling and pole-zero pairing.**<br>**Design complete filter in Matlab environment. For hardware testing use IIR implementation based on cascade of second-order sections.** | Zeleňák<br>Kolesárová |
| 3. | **Design and implement Finite Infinite Impulse Response (FIR) and Infinite Impulse Response (IIR) low-pass digital filters with the following parameters (requirements):**<br>**1) pass-band edge frequency 3 kHz**<br>**2) stop-band frequency 4 kHz**<br>**3) sampling frequency is 48 kHz**<br>**4) maximal allowed pass-band ripple is 0.1 dB**<br>**5) stop-band attenuation must be at least 70 dB**<br>**6) use minimal number of filter coefficients and optimize it for 16-bit fixed point DSP implementations by using proper scaling and pole-zero pairing.**<br>**Design complete filter in Matlab environment. For hardware testing use IIR implementation based on cascade of second-order sections.** | Suchý<br>Dupák |
| 4. | **Design and implement Finite Infinite Impulse Response (FIR) and Infinite Impulse Response (IIR) high-pass digital filters with the following parameters (requirements):**<br>**1) pass-band edge frequency 4 kHz**<br>**2) stop-band frequency 3 kHz**<br>**3) sampling frequency is 48 kHz**<br>**4) maximal allowed passband ripple is 0.1 dB**<br>**5) stop-band attenuation must be at least 70 dB**<br>**6) use minimal number of filter coefficients and optimize it for 16-bit fixed point DSP implementations by using proper scaling and pole-zero pairing.**<br>**Design complete filter in Matlab environment. For hardware testing use IIR implementation based on cascade of second-order sections.** | Kočiš<br>Kreheľ |

**Project requirements:**

- project must be written in English (printed as well as included in PDF format)
- it must contain description of used design method
- schematic of used filter realization
- designed coefficients
- discussion of results
- filter should be tested on target DSP hardware (file format for target DSP will be defined during exercises)
- projects must be defended in week 13 (using power-point presentation)