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## Electronics and Communication Engineering Department
### DIGITAL SIGNAL PROCESSING (BEC-303)
### ASSIGNMENT - IV

1. What are the basic building blocks of realisation structures?

2. Compare Direct Form I and Direct Form II realization of IIR filters.

3. What are the drawbacks of direct form realisation of IIR systems?

4. Draw the block diagram representation of the direct form I and II realisations of the systems with the following transfer functions.

   (a) $\quad H(z) = \dfrac{0.28z^2 + 0.319z + 0.01}{0.5z^3 + 0.3z^2 + 0.17z - 0.2}$

   (b) $\quad H(z) = \dfrac{2 + 3z^{-1} - 8z^{-2} + 4z^{-5}}{2 + 3z^{-1} + 6z^{-3}}$

5. Obtain the cascade and parallel realisation structures for the following signals.

   (a) $\quad y(n) = \dfrac{3}{4}y(n-1) - \dfrac{1}{8}y(n-2) + x(n) + \dfrac{1}{3}x(n-1)$

   (b) $\quad H(z) = \dfrac{z(z + \frac{1}{2})(z^2 + \frac{1}{3})}{(z - \frac{1}{2})(z + \frac{1}{2})(z^2 - z + \frac{1}{2})}$

6. Develop the cascade and parallel forms of the following casual IIR transfer functions.

$$H(z) = \dfrac{(3 + 5z^{-1})(0.6 + 3z^{-1})}{(1 - 2z^{-1} + 2z^{-2})(1 - z^{-1})}$$

7. Sketch the ladder structure for the following system

$$H(z) = \dfrac{2 + 8z^{-1} + 6z^{-2}}{1 + 8z^{-1} + 12z^{-2}}$$

8. Obtain FIR linear-phase and cascade realisations of the system function

$$H(z) = (1 + \dfrac{1}{2}z^{-1} + z^{-2})(1 + \dfrac{1}{4}z^{-1} + z^{-2})$$

9. What are the effects of finite word length in digital filters?

10. Discuss the need for quantization? Also, analyze truncation and round-off processes in binary number representations.

11. Why is rounding preferred over truncation in realizing digital filters?

12. Explain coefficient quantization.