Lund University
## Department of Electrical and Information Technology

Systems and Signals, EITF75 Task 1 (out of 2)

Deadline: Complete the task, and hand it in in the course mailbox at the third floor no later than Monday October 5, 08.00.

Write your name on every paper
Statements must be well motivated by reasoning and/or equations Points from the tasks will be added to the examination score Maximum total score (exam + 2 tasks) = 5.0+0.5+0.5=6.0p Exam Grading: 3 (>2.9p), 4 (>3.9p), 4 (>4.9p)

1. For an input $x(n) = u(n)$ (a step), compute the output signal of the system $y(n) + y(n-1) + 0.5y(n-2) = x(n) + 0.5x(n-1)$. The system is assumed at rest.

2. Assume the same system as in 1), but not at rest. Further, assume an input $x(n) = \delta(n)$. Determine, if possible, the initial conditions so that $y(n) = 0, n \geq 0$.

3. This is a Matlab problem. In the below figure, there are two transfer functions shown.
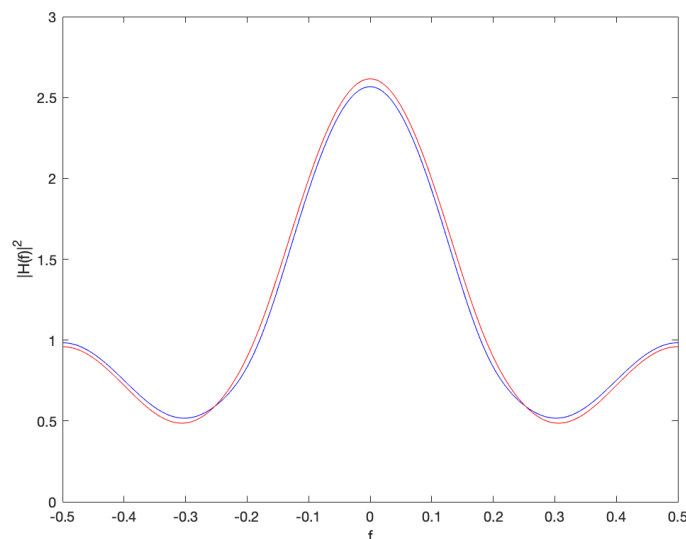
The two filters have the following zeros/poles

	Zeros	Poles
Filter A	$0.6e^{\pm i2\pi \cdot 0.2}, 0.5e^{\pm i2\pi \cdot 0.3}$	$0.55e^{\pm i2\pi \cdot 0.2}$
Filter B	$0.58e^{\pm i2\pi \cdot 0.2}, 0.52e^{\pm i2\pi \cdot 0.3}$	$0.55e^{\pm i2\pi \cdot 0.2}$

Use Matlab to determine which transfer function in the picture that corresponds to which zero/pole configuration.