UNIVERSITA' DEGLI STUDI ROMA TRE
CdS in ***Biomedical Engineering***

class of
Signal Processing for Biomedical Engineering

iNGEGNERIA
DIPARTIMENTO DI ECCELLENZA

Written test of Feb. 13th 2020. .

note: This test is valid only for registered students. Test delivery implies that previous results (if any) are canceled.

Family and first names (in all CAPITALS): _____ _____

signature: _____

Roma3 registration number: _____ or ID card number: _____

born on (day/month/year): _____ / _____ / _____

In the academic year 2019/2020 registered for the ___ year of the MS course in

_____

e-mail (write legibly): _____ @ _____

Exercises:

1. Given the linear equation (where *x(n)* is the filter's input and *y(n)* is its output):

   $$y(n) = -1.2\, y(n-1) + x(n)$$

   find the transfer function *H(z)* of the filter and the *stable* pulse response *h(n)*. In particular, compute the following numerical values: *h(-2), h(-1), h(0), h(1), h(2)*.

2. A random sequence {s(n)} is observed for 4 samples:

   -3 5 -2 1

   determine its *AR spectral estimate* of the first order Ps(ω) of power spectral density of the random series {s(n)}.