



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

class of  
***Signal Processing for Biomedical  
Engineering***

**Written test of February 16th 2016.**

*note:* This test is valid only for registered students. Test delivery implies that previous results are canceled.

Family and first name (printed): \_\_\_\_\_

signature: \_\_\_\_\_

Roma3 registration number: \_\_\_\_\_ or ID card number: \_\_\_\_\_

born on (day/month/year): \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

In the academic year 2015/2016 registered at the \_\_\_\_ year of the master course in

\_\_\_\_\_

e-mail (write in clear letters): \_\_\_\_\_ @ \_\_\_\_\_

Exercises:

- 1) Let  $x(n)$  be a sequence with its Fourier's spectrum  $X(\omega)$ , obtain the spectrum  $Y(\omega)$  of the sequence  $y(n)$  defined as:

$$y(n) = x(2n+1) + x(2n-1)$$

- 2) Perform a digital system to emulate an analog delay of half sampling period that also neglects the frequency contents between  $\omega = -\pi/4$  and  $\omega = \pi/4$  (being  $\omega$  the radian normalized frequency).