Elements of signal theory and control

Academic year 2024-2025

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IDSIA - DTI

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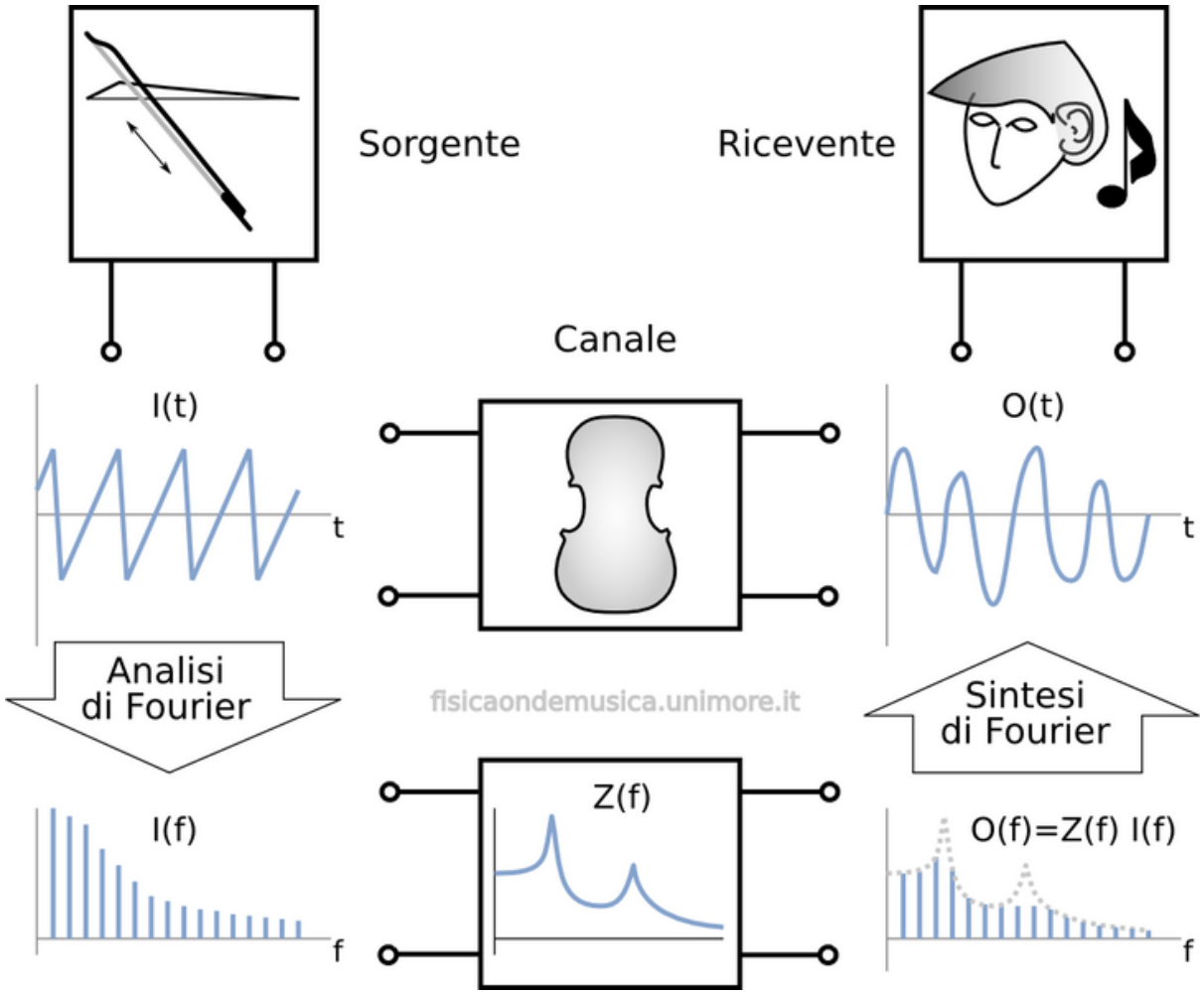
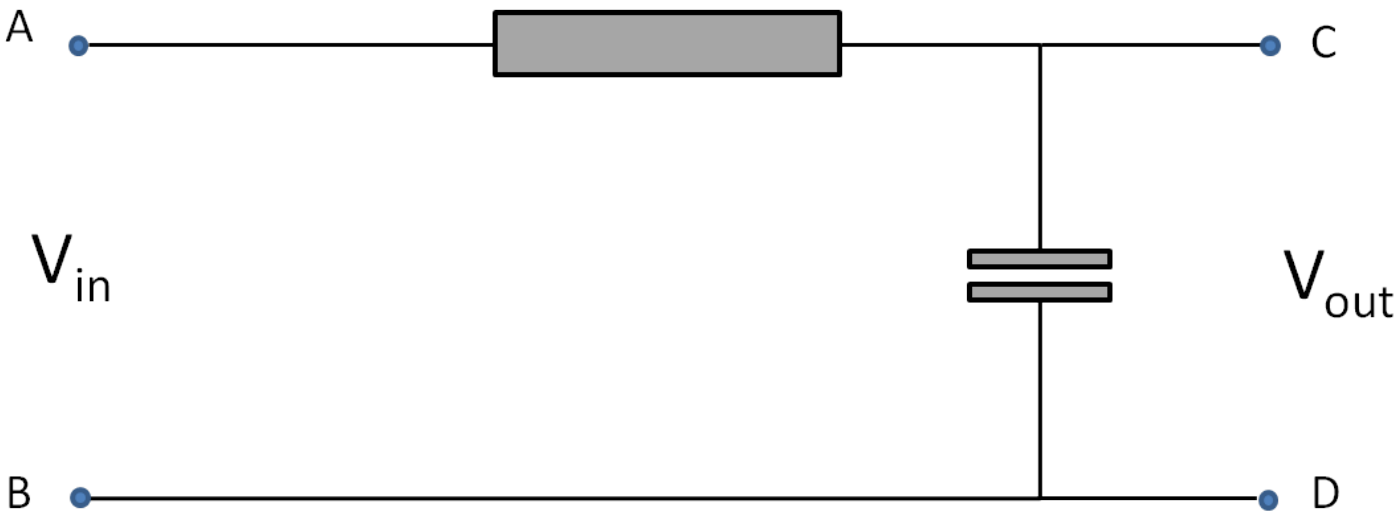
Elements of signal theory and control: program

1. Introduction:
   - Signals and sampling
   - Analogical and digital signals
2. Fourier series:
   - Vectors spaces. Orthogonal projection
   - Periodic signals decomposition in sinusoidal waves;
   - Fourier spectrum of periodic signals.
3. Fourier Trasform:
   - Non- periodic signals decomposition in sinusoidal waves;
4. Discrete Fourier Transform (DFT):
   - Sampled signals analysis.
5. Laplace Transform:
   - Linear systems described by differential equations.
6. Wavelets transform:
   - Introduction to wavelets and their transforms

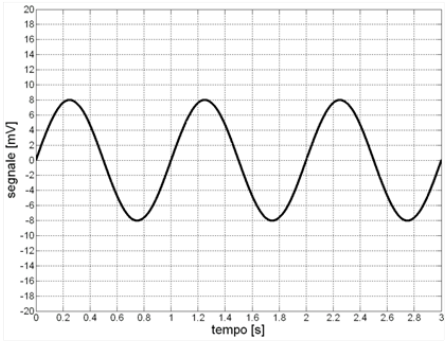
Sound analysis

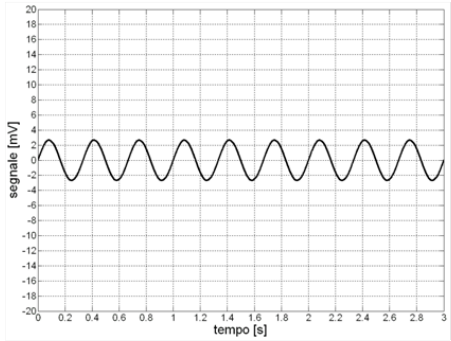


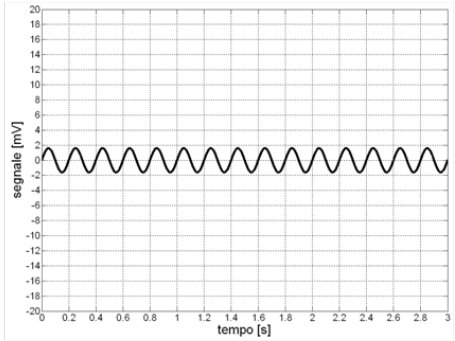
RC circuit



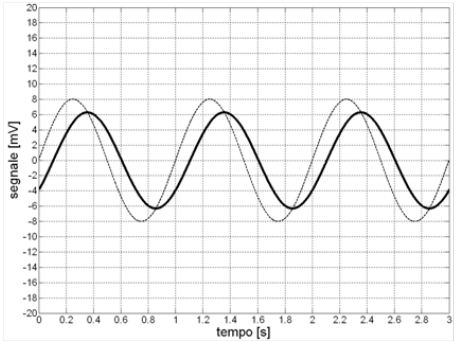
Circuito RC, componenti sinusoidali del segnale in input

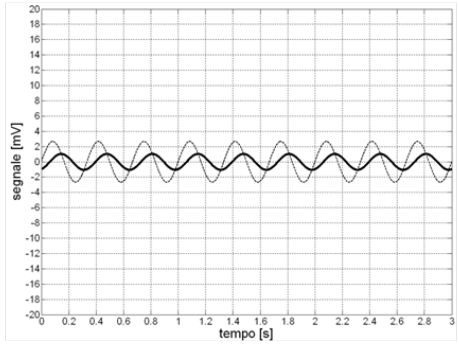


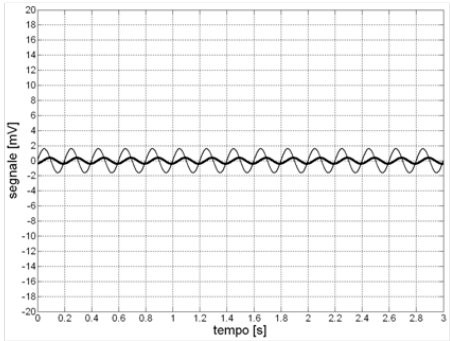




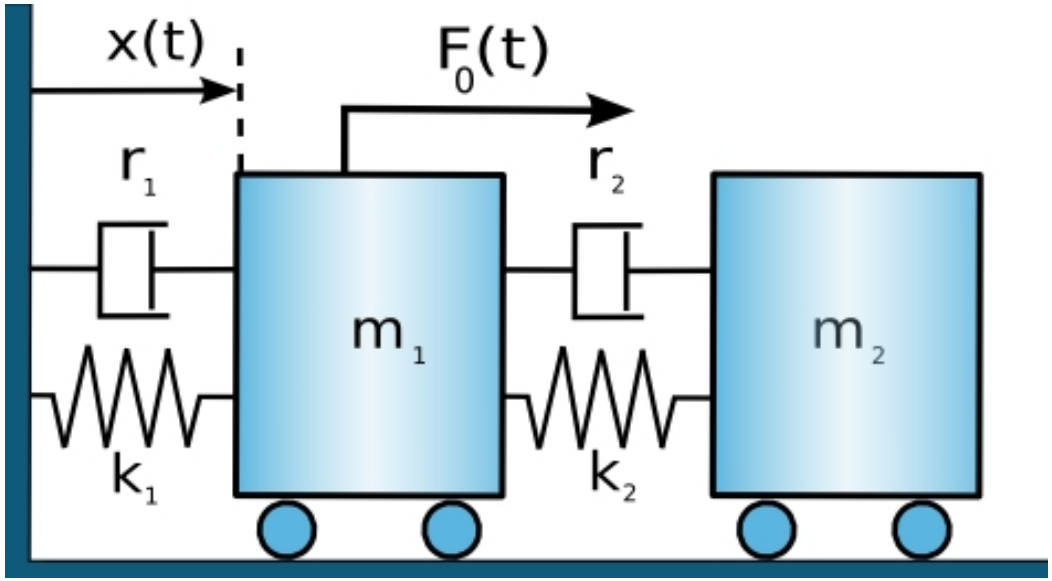
Circuito RC, componenti sinusoidali del segnale in output



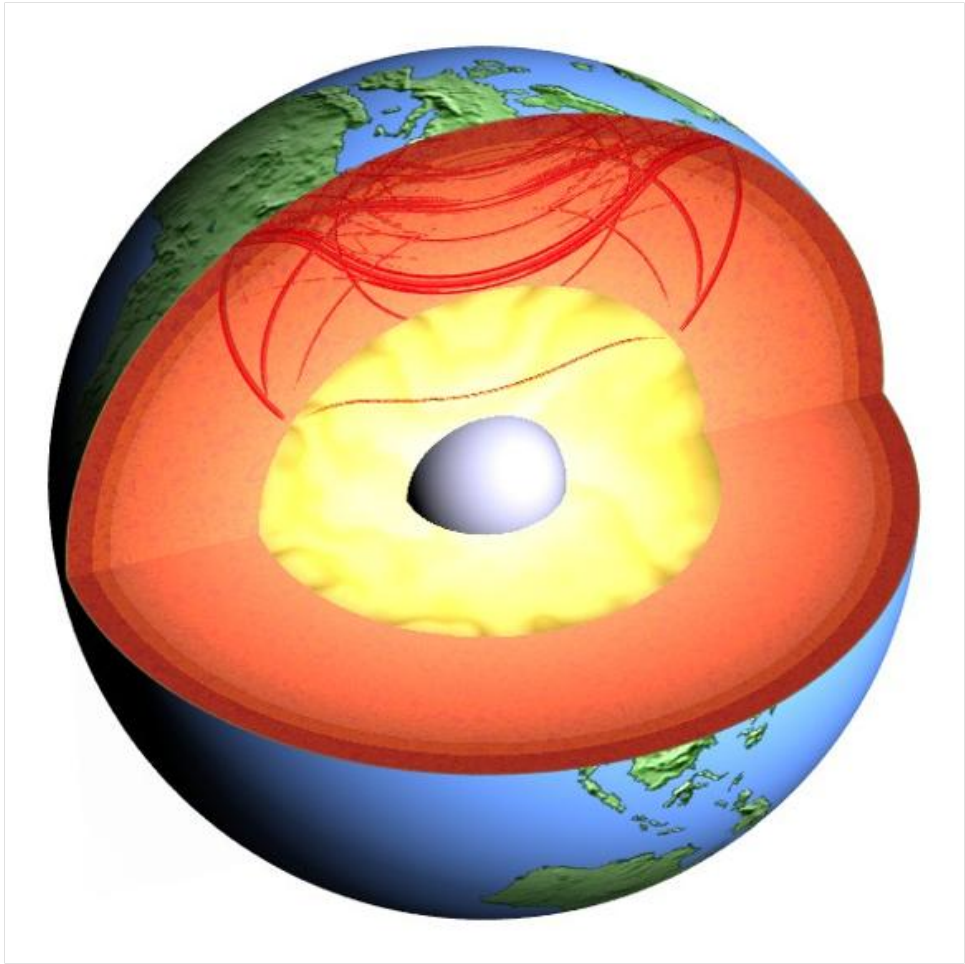


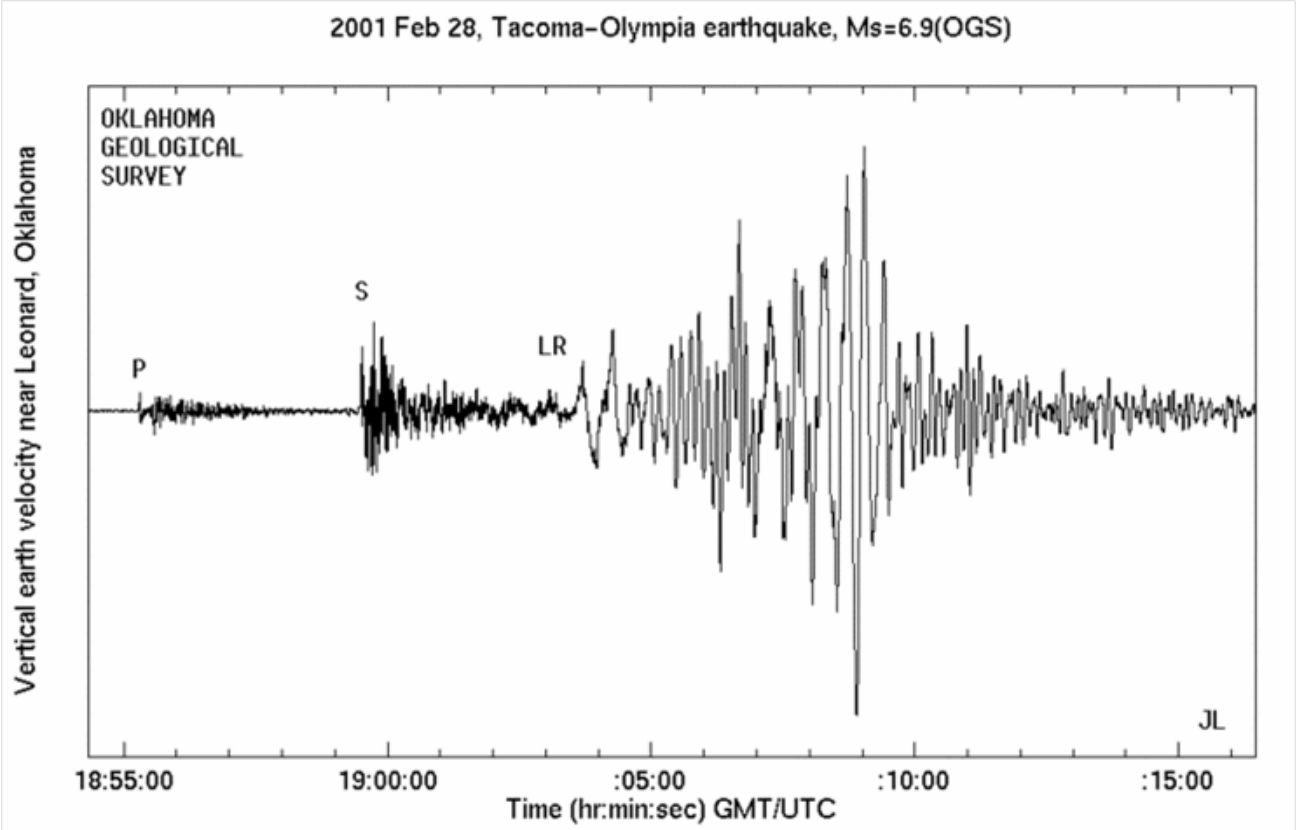


Mechanical systems

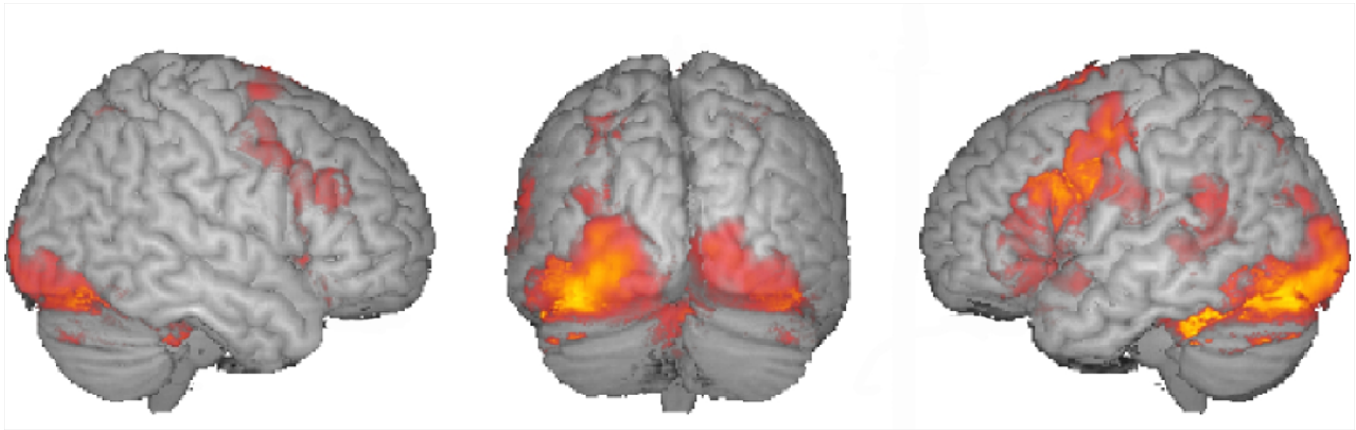


Sismology

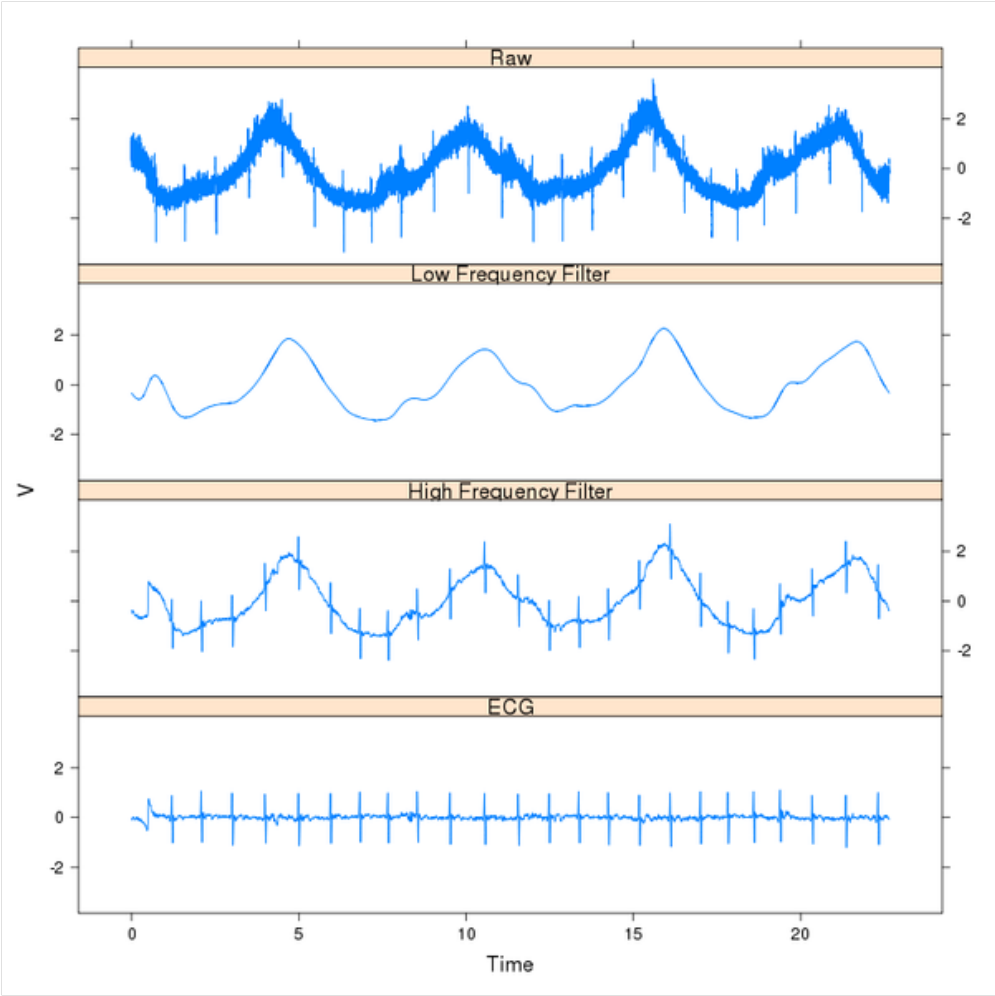



2001 Feb 28, Tacoma–Olympia earthquake, Ms=6.9(OGS)
OKLAHOMA
GEOLOGICAL
SURVEY
Vertical earth velocity near Leonard, Oklahoma
P
S
LR
JL
18:55:00
19:00:00
:05:00
:10:00
:15:00
Time (hr:min:sec) GMT/UTC

Neuroimaging



Signal filters



Spiking neurons