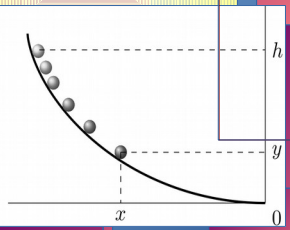


Tautochrone problem



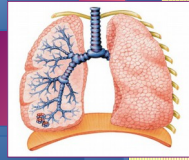
Title: Abel.eps
Creator: GIMP PostScript file plugin V
CreationDate: Tue Feb 11 13:41:25 2014
LanguageLevel: 2

Cole-Cole,
Davidson-Cole,
Havriliak-Negami
models

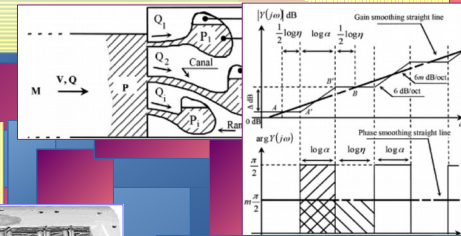
$$G(s) = \frac{K}{\left[\left(\frac{s}{\omega_0}\right)^\alpha + 1\right]^\beta}$$

$$G(s) = \frac{K}{\left(\frac{s}{\omega_0}\right)^\alpha + 1}$$

CRONE modeling and synthesis
real and complex
fractional order integro-differentiation

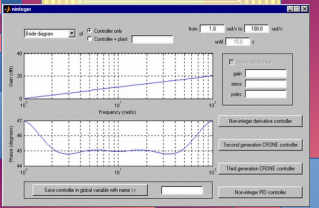
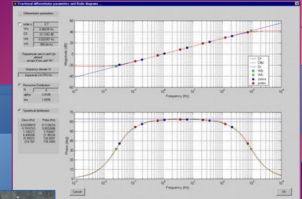


Biological models

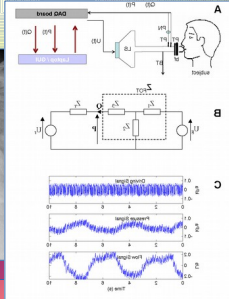
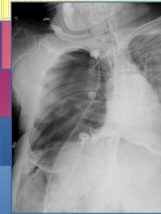


Ninteger

CRONE



Human respiratory system



Tissue alterations
in pathological states

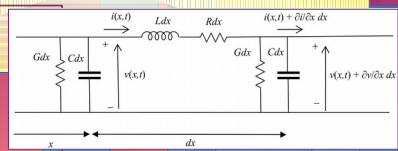


$$G(s) = \left(\frac{\omega_{cg}}{s}\right)^{a+ib}$$



Hydractive suspension

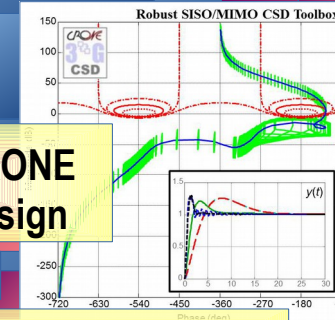
Electrical transmission lines



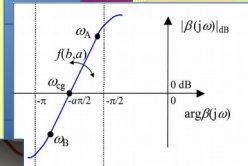
Multimedia streaming



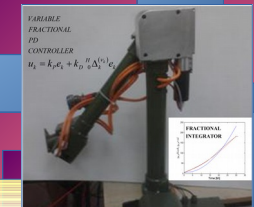
Complex non-integer
differentiation



Robust CRONE
control design



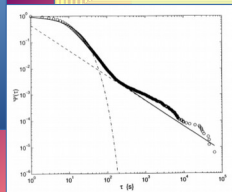
Complex
fractional order
integro-differentiation



Contributors

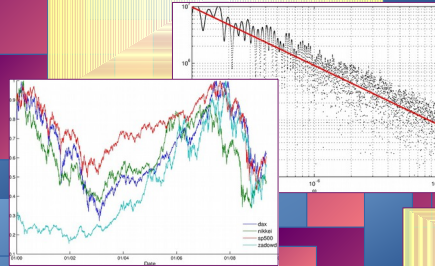
- Dumitru Baleanu
- Gary Bohannon
- Riccardo Caponetto
- Piotr Duch
- Mark Edelman
- Christophe Farges
- Hans Haubold
- Clara Ionescu
- Virginia Kiryakova
- Patrick Lanusse
- António Lopes
- Guido Maione
- Pierre Melchior
- Francesco Mainardi
- Rachid Malti
- Xavier Moreau
- Raoul Nigmatullin
- Piotr Ostalczyk
- Manuel Ortigueira
- Alain Oustaloup
- Ivo Petras
- Jocelyn Sabatier
- Dragan Spasić
- Jozsef Tar
- Duarte Valério
- Stéphane Victor
- Bruce West

Finance

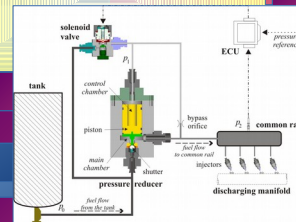


Dynamical systems

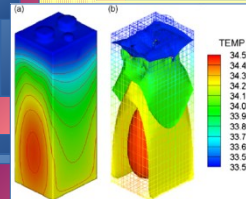
Signal processing



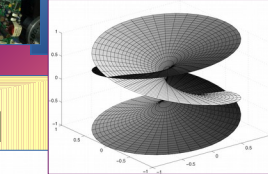
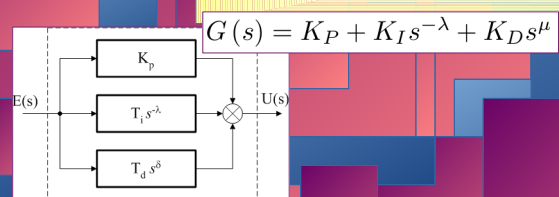
Injection systems



Lithium-ion batteries
ultracapacitors
fuel cells
thermal rods

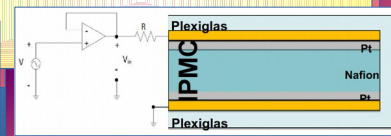


Fractional PID control



Trajectory planning

Fractional Order Element

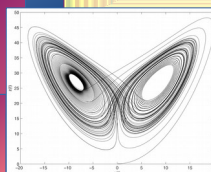


Genetics

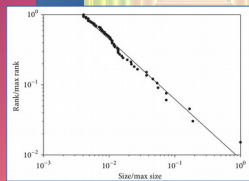


Electromagnetism

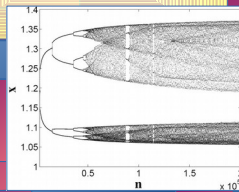
Chaos



Power Law



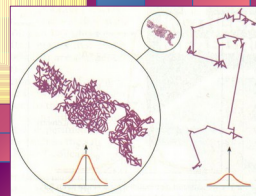
Single trajectory



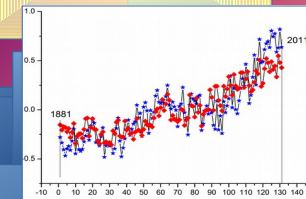
Fractional Calculus Models, Algorithms, Technology

J. Tenreiro Machado, 2015

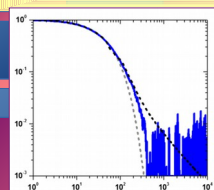
Brownian motion
and
Lévy flights



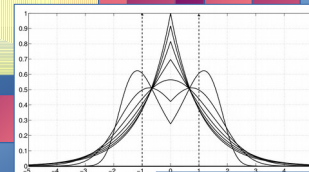
Fractals and
Self-similarity



Complex systems



Diffusion to wave
propagation



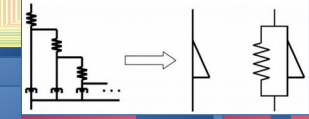
Variational principles

$$\frac{\partial C}{\partial \phi} + \sum_{k=1}^n \left\{ D_{-\infty^+}^\alpha \frac{\partial C}{\partial D_{-\infty^+}^\alpha \phi} + D_{-\infty^+}^\alpha \frac{\partial C}{\partial D_{-\infty^+}^\alpha \phi} \right\} = 0$$

Special functions

Stochastic processes

Viscoelasticity



Entropy

Fractance

