

Downloadable Matlab scripts for scientists

available online at:

<http://terpconnect.umd.edu/~toh/spectrum/SignalProcessingTools.html>

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Application areas in which my programs have been used based on published articles and on email correspondence with users.

Note: Judging from the ratio of downloads to emails, most people who have downloaded my software don't write me about what they are doing, which of course is completely understandable. Also, of the people who do write to me, most do not tell me specifically what their applications are, which is their prerogative. As a result, I have only incomplete information about the application areas where my programs are being applied. This is what I know so far:

- Spectral curve fitting
- Temperature Programmed desorption spectroscopy
- Scanning/Transmission Electron Microscopy (SEM/TEM)
- Time series microarray expression analysis
- High-resolution spectra of nuclear decays from the TRIUMF Gamma-Ray Escape-Suppressed Spectrometer.
- Magnetic Barkhausen Noise signal obtained during a cyclic magnetisation process on a steel sample.
- X-ray powder diffraction
- Respiratory rate measurements
- Frequency spectrum analysis of dynamic transfer functions
- Fluorescence spectroscopy
- Multicomponent Spectrophotometry
- Eye motion tracking in mutant larval zebrafish.
- Excitatory PostSynaptic Potential (EPSP) measurements
- Atmospheric boundary layer height and backscatter ratio by LIDAR.

- ECG data
- Photoluminescence data
- Synchrotron FTIR data collected on muscle samples.
- GC/MS (Gas chromatography/mass spectroscopy)
- Acoustics and Fluid Dynamics
- Raman spectroscopy
- Impulse noise in wireless communication
- Probability density function of Antarctic sea ice thickness
- Photoplethysmography (PPG)
- Spectral absorption features in highly cluttered spectral curves
- Fourier transform infrared spectroscopy (FTIR)
- High performance liquid chromatography (HPLC)
- Hyperspectral remote sensing
- Wear measurements based on the radio-isotope technique
- UV Resonance Raman spectra of lubrication samples
- Cancer diagnosis using fluorescence and reflectance spectroscopy
- Analysis of climate data from daily to seasonal time scale
- High resolution glow discharge atomic spectroscopy
- Arctic ice cap neutron-scattering snow density probe
- Fluorescence coming from single-walled carbon nanotubes
- Mouse olfactory system using fluorescent imaging techniques
- Power density spectrum of an outdoor temperature signal
- Analysis of metal ions by chemometric methods
- Analysis of airborne particulates by high resolution atomic emission spectroscopy
- Analysis of kinetic data.

- Fluorescence imaging to record brain activity.
- Ocean-atmosphere-sea ice-snow pack interactions
- Laser Induced Breakdown Spectroscopy
- Quantum dot photoluminescence spectra
- UV absorption experiments on protein samples
- Indentation Modulus of elastic materials
- Technical analysis of stock market data.
- Analyzing calcium imaging data in nerve tissue.
- Microelectrode recording in the subthalamic nucleus during deep brain stimulation surgery for Parkinson's disease.
- Raman spectra of multi-phase silicon.
- Aeolian beach sand transport.
- Peak detection in multidimensional chromatographic systems
- NMR peaks of Hyperpolarized Xenon-129 dissolved in tissues and red blood cells.
- Continuous-flow drinking water quality monitoring for pH, turbidity, conductivity.
- Analysis of MR spectroscopic data
- Fluorescence intensities of Ca^{2+} indicators
- Envelope of ultrasonic echo signals.
- Elemental concentrations of metal particulates in oil samples.
- Analysis of grains and oilseeds.
- Surface-Topography characterization.
- Raman spectroscopy of skin
- Effect of irrigation on soil moisture and the water cycle
- Processing of ocean current data
- Scattered light in gold nanoparticles
- Power of a dredging pump against time

- FTIR of carrageenan types.
- Variable star brightness data
- Breathing analysis data
- Colliding car accelerometer data
- Quantitative Evaluation of Minerals by Scanning Electron Microscopy
- Laser diffraction particle size analysis
- Separation of Raman and fluorescence signals
- Analysis of single-cell dynamics
- Spectral analysis of impurities in Helium and Deuterium plasmas
- Nanoindentation and FIB-SEM, for the characterization of materials.
- FTIR contributions from CO chemisorbed to different facets of Pt nanoparticles.
- Peak fitting in histogram data.
- Hydraulic tests in fractured rock
- Analysis of gamma ray spectra