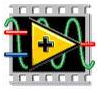
Data Analysis

Gary Boorman

Mathematical Functions

- Basic functions: Trigonometric, Exponential etc
- Matrix algebra
- Calculus
- Curve Fitting
- Statistics & Probability
- Can get third-party add-on packages for even more variety

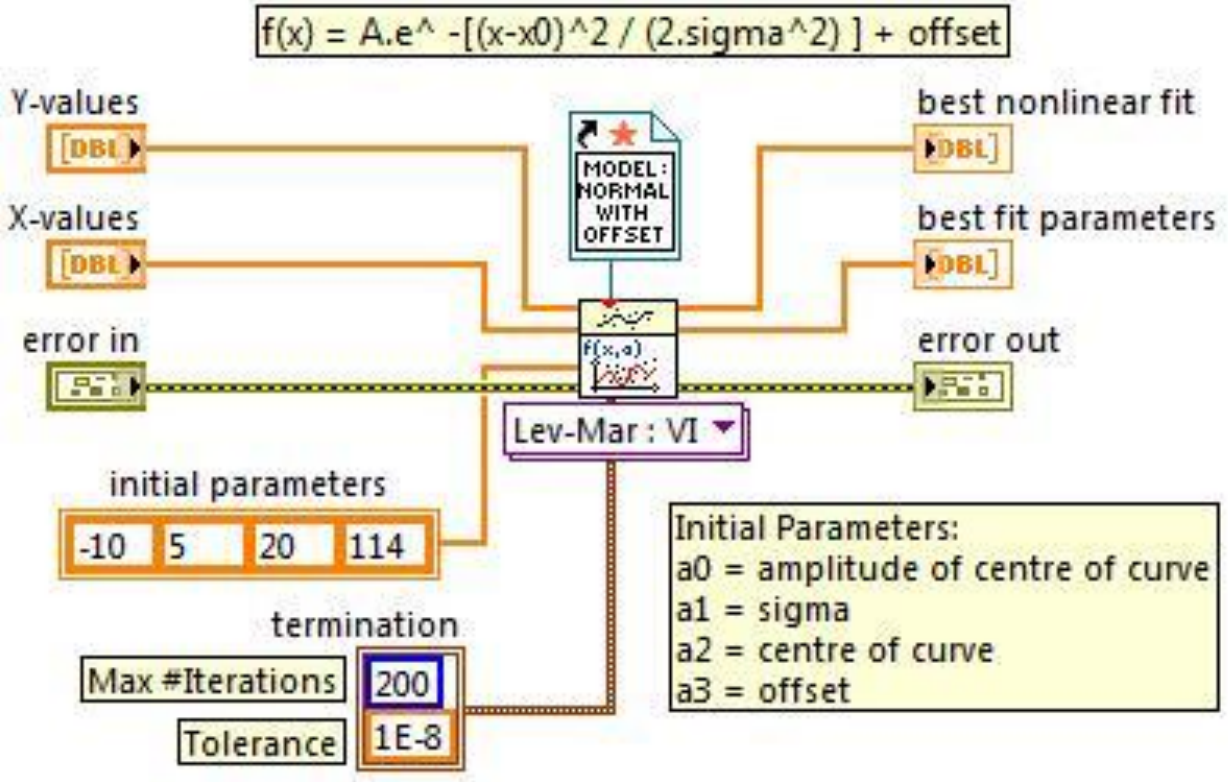


Curve Fitting I

- Can use basic fitting: straight line, exponential, power, Gaussian etc
- Use *Nonlinear Curve.vi* for non-standard curves
- Be aware of errors -20041 *Input Matrix is singular* and -20062 *Max Number of Iterations exceeded*

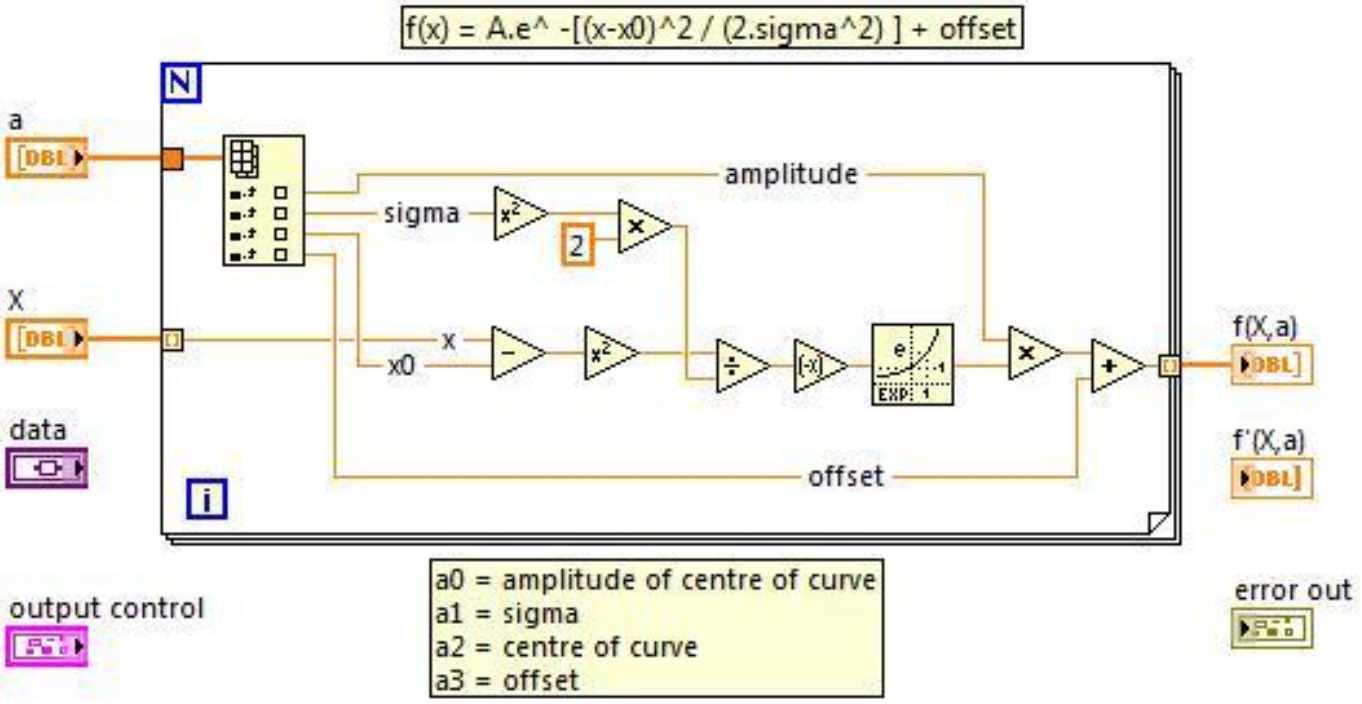
Curve Fitting II

Using *Nonlinear Curve.vi*



Curve Fitting III

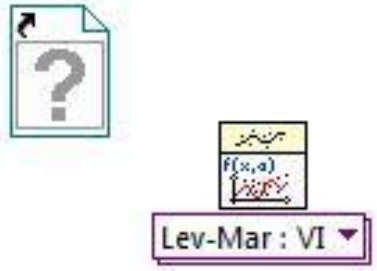
The *Model*:



Curve Fitting IV

Generating a Model for a curve-fitting:

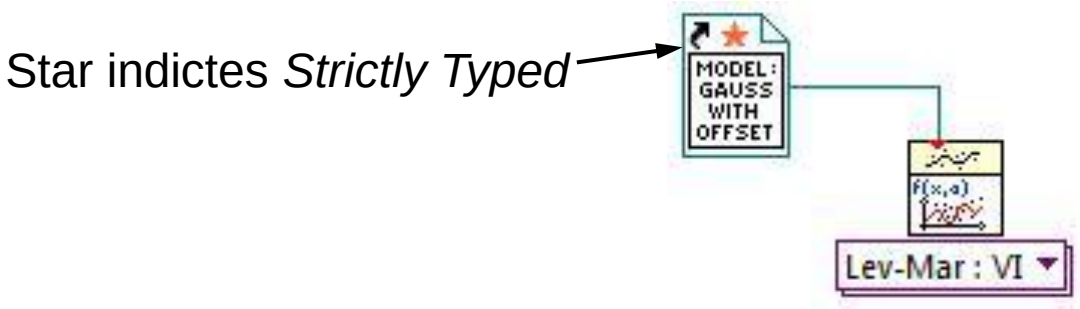
- Open template located at *labview\vi.lib\gmath\NumericalOptimization\LM model function and gradient.vit*
- Fill in diagram and save as *Modelname.vi*
- Grab *Application Control>>Static VI Reference* and place on diagram



Curve Fitting V

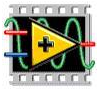
Using a Model for a curve-fitting:

- Right-click *Static VI Reference* and do *Browse for Path*. Select *Modelname.vi*
- Right-click and select *Strictly Typed VI Reference*. Wire to the *NonLinear Curve Fit.vi*



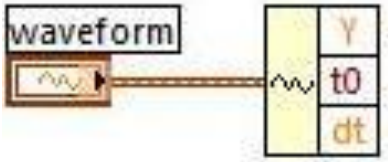
Signal Processing

- Signal and Waveform generation
- Conditioning: filtering, convolution etc
- Measurement: RMS, distortion, spectra etc
- Transforms
- Can get third-party add-on packages for even more variety



Waveform Revisited

- DAQ HW can generate arrays or waveforms
- Waveform has embedded timing information



- Sub-VIs to scale waveforms, get subsets, normalize, search etc
- Can generate various functions, noise, chirps, sweeps...

Waveforms – Point-by-Point

- For generating/acquiring/analysing data one point at a time
- Useful for slowly-acquired signals and up-to-date analysis