Subject: Re: multiple non-linear regression analysis
Posted by thompson on Tue, 17 Apr 2001 21:39:54 GMT
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"Kenlo Nishida" <kenlo@ntsg.umt.edu> writes:

> Dear IDL news group:

> How can I make multiple non-linear regression analysis with IDL?
> I know "LMFIT" command can make a non-linear regression analysis
> for a single independent variable. However, I want to know
> an appropriate command or function of IDL which provide me with
> a fitting of an arbitrary non-linear function with two or more
> independent variables. I mean, I want to determine the following
> three parameters (a, b, c):

> y=f(x1, x2, x3; a, b, c)

> Here x1, x2, and x3 are arrays of independent variables each
> containing n data. y is an array of dependent variable with
> n data. a, b, and c are scalars (parameters) which determine
> the non-linear function f(x1, x2, x3).

The simplest way to do this is to define your function so that the input array is a structure. For example, suppose that x1, x2, x3 are all floating point arrays of size N. You could then define your structure via

```
s = {x1: 0.0, x2: 0.0, x3: 0.0}
s = replicate(s, n_elements(x1))
s.x1 = x1
s.x2 = x2
s.x3 = x3
```

Thus, s is a structure array of N elements, and an individual element s(i) contains x1(i), x2(i), and x3(i). For example

```
IDL> help,s
S               STRUCT    = -> <Anonymous> Array[100]
IDL> help,s(0),/str
** Structure <403eeb48>, 3 tags, length=12, refs=2:
   X1              FLOAT        -0.923884
   X2              FLOAT         0.192019
   X3              FLOAT        -0.277066
```

You could then write your function along the lines of

```
function myfunc, s, a
return, a[0] + a[1]*s.x1 + a[2]*s.x2 + a[3]*s.x3
```

end

You can then put this function into a fitting routine in the normal manner. (With appropriate changes for whatever peculiarities a particular fitting routine may require. For example, LMFIT wants the partial derivatives returned as extra dimensions in the result.)

Bill Thompson