
Subject: Re: IDL fitting of piecewise continuous function
Posted by [Jeremy Bailin](#) on Tue, 17 May 2011 19:21:49 GMT
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Craigh Markwardt's MPFIT (and its variants) is most people's preferred fitting routine:

<http://www.physics.wisc.edu/~craigm/idl/fitting.html>

You define your own function to feed in, so it can have whatever behaviour you want. To ensure continuity, I would recommend re-parametrizing the functional form so that it is continuous by definition. In this, case, A and B aren't actually independent, so calculate B in terms of A by setting them equal at $x=x_m$, which gives

$$B = A x_m^{3/2}$$

So you're actually fitting:

$$f(x) = \begin{cases} A x_m^{1/2} x^{1/2} & x < x_m \\ A x_m^{3/2} x^{-1} & x > x_m \end{cases}$$

-Jeremy.

Subject: Re: IDL fitting of piecewise continuous function
Posted by [Jeremy Bailin](#) on Tue, 17 May 2011 19:24:25 GMT
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sorry, that should be:

$$f(x) = \begin{cases} A x^{1/2} & x < x_m \\ A x_m^{3/2} x^{-1} & x > x_m \end{cases}$$

-Jeremy.

Subject: Re: IDL fitting of piecewise continuous function
Posted by [Sasha Singh](#) on Tue, 17 May 2011 19:26:41 GMT
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Thanks Jeremy,

I did look look at MPFIT. I am confused as to how do I define the constraints $x < x_m$ and $x > x_m$ in the function. Sorry I am quite new to IDL.

Sasha

On May 17, 3:21 pm, Jeremy Bailin <astroco...@gmail.com> wrote:

> Craigh Markwardt's MPFIT (and its variants) is most people's preferred fitting routine:

>

> <http://www.physics.wisc.edu/~craigm/idl/fitting.html>

>

> You define your own function to feed in, so it can have whatever behaviour you want. To ensure continuity, I would recommend re-parametrizing the functional form so that it is continuous by definition. In this, case, A and B aren't actually independent, so calculate B in terms of A by setting them equal at $x=x_m$, which gives

> $B = A x_m^{(3/2)}$

>

> So you're actually fitting:

>

> $f(x) = A x_m^{(1/2)} x^{(1/2)} \quad x < x_m$

> $A x_m^{(3/2)} x^{(-1)} \quad x > x_m$

>

> -Jeremy.

Subject: Re: IDL fitting of piecewise continuous function

Posted by [Jeremy Bailin](#) on Tue, 17 May 2011 19:53:19 GMT

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If you define your function analogously to the example in the MPFIT code, it might look like:

```
FUNCTION MYFUNCT, p, X=x, Y=y, ERR=err
```

```
  ; p[0] is A
```

```
  x_m = SOME_CONSTANT_VALUE
```

```
  ; x lt x_m is 1 if x<x_m and 0 otherwise
```

```
  ; x ge x_m is 1 if x >= x_m and 0 otherwise
```

```
  model = (x lt x_m) * p[0] * x^(0.5) + (x ge x_m) * p[0] * x_m^(1.5) / x
```

```
  return, (y-model)/err
```

```
END
```

Of course, that assumes that x_m is a constant, not a parameter - but if it's a parameter, you would just use $p[1]$ instead of a constant value, for example.

-Jeremy.

Subject: Re: IDL fitting of piecewise continuous function

Posted by [Craig Markwardt](#) on Wed, 18 May 2011 02:35:13 GMT

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On May 17, 3:53 pm, Jeremy Bailin <astroco...@gmail.com> wrote:

> If you define your function analogously to the example in the MPFIT code, it might look like:

>

> FUNCTION MYFUNCT, p, X=x, Y=y, ERR=err

> ; p[0] is A

> x_m = SOME_CONSTANT_VALUE

>

> ; x lt x_m is 1 if x < x_m and 0 otherwise

> ; x ge x_m is 1 if x >= x_m and 0 otherwise

> model = (x lt x_m) * p[0] * x^(0.5) + (x ge x_m) * p[0] * x_m^(1.5) / x

>

> return, (y-model)/err

> END

>

> Of course, that assumes that x_m is a constant, not a parameter - but if it's a parameter, you would just use p[1] instead of a constant value, for example.

Yep, what he said.

Craig
