Subject: Re: How to calculate the curve area?
Posted by Benjamin Hornberger on Tue, 21 Jun 2005 19:49:04 GMT
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Julio wrote:

> Hello!

>

- > Although my question is very simple, I haven't got it.
- > I'm using PLOT command to plot curve from a 2D matrix. My problem is I
- > need to calculate the area bellow the curve.

>

How about using TOTAL() on the dataset (if it is equally spaced)?

Benjamin

Subject: Re: How to calculate the curve area?
Posted by Julio[1] on Tue, 21 Jun 2005 20:04:19 GMT
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Hi Benjamin.

The total command returns me returns the sum of the elements of an array. However, I need to find the area of the curve.

I found the TSUM.PRO routine (see below), it calculates the integrated area of a curve. I think it is what I need, Thanks at any rate, Julio

http://idlastro.gsfc.nasa.gov/ftp/pro/math/tsum.pro

Subject: Re: How to calculate the curve area?

Posted by Benjamin Hornberger on Tue, 21 Jun 2005 20:19:48 GMT

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## Julio wrote:

- > Hi Benjamin.
- >
- > The total command returns me returns the sum of the elements of an
- > array. However, I need to find the area of the curve.

>

Well, as long as the dataset is equally spaced on the X axis, the result from TOTAL is proportional to the area under the curve. If it's not

equally spaced, you could interpolate. It's just a question of the units on each axis. Or am I missing something?

## Benjamin

Subject: Re: How to calculate the curve area?
Posted by Paul Van Delst[1] on Tue, 21 Jun 2005 20:30:32 GMT
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```
Julio wrote:
```

> Hi Benjamin.

>

- > The total command returns me returns the sum of the elements of an
- > array. However, I need to find the area of the curve.

>

- > I found the TSUM.PRO routine (see below), it calculates the integrated
- > area of a curve. I think it is what I need,
- > Thanks at any rate,
- > Julio

>

> http://idlastro.gsfc.nasa.gov/ftp/pro/math/tsum.pro

>

You could use the INT\_TABULATED IDL function.

Or use Simpson's rule. I have a integral.pro routine that does this. From the header:

# **CALLING SEQUENCE:**

```
result = integral(x, y)
```

#### INPUTS:

- x: Vector of abscissa points. Elements must be unique and monotonically increasing.
- y: Vector of corresponding ordinate points.

## **EXAMPLE:**

Define 11 x-values on the closed interval [0.0, 0.8].

$$IDL > x = [0.0, .12, .22, .32, .36, .40, .44, .54, .64, .70, .80]$$

Define 11 f-values corresponding to x(i).

```
IDL> f = [ 0.200000, 1.30973, 1.30524, 1.74339, 2.07490, 2.45600, $ IDL> 2.84299, 3.50730, 3.18194, 2.36302, 0.231964 ]
```

Compute the integral:

IDL> result = integral(x, f) IDL> HELP, result **RESULT** DOUBLE = 1.6274544

In this example, the f-values are generated from a known function,  $(f = .2 + 25 \times x - 200 \times x^2 + 675 \times x^3 - 900 \times x^4 + 400 \times x^5)$ 

The Multiple Application Trapezoid Method yields; result = 1.5648 The Multiple Application Simpson's Method yields; result = 1.6036 IDL User Library INT\_TABULATED.PRO yields; result = 1.6232 INTEGRAL.PRO yields; result = 1.6274 The Exact Solution (4 decimal accuracy) yields; result = 1.6405

paulv

Paul van Delst CIMSS @ NOAA/NCEP/EMC

Subject: Re: How to calculate the curve area? Posted by Julio[1] on Tue, 21 Jun 2005 21:23:40 GMT View Forum Message <> Reply to Message

Now I'm using int\_tabulated.pro (from IDL library). It's working fine...

Best Regards! Julio