LeeSmithSBCC / **Jupyter-Math-For-Nerds**

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LeeSmithSBCC Added Integrals   37772ea 6 minutes ago

1 contributor

654 lines (653 sloc)   35.9 KB   ☑ Show spaces   <> ▤   Raw   Blame   History   🖥 ✎ 🗑

Just about any Integral !!!

Definite and Indefinite

- Derivative of one dimensional variable
- Derivative of multimensional variable

    #### If integrate function is unable to compute an integral, it returns an unevaluated Integral object

```
In [2]: from sympy import *
        init_printing()
```

```
In [3]: x, y, z = symbols("x, y, z")
```

```
In [4]: a, b,c,d = symbols ('a b c d')
```

Simple One Dimension -- Indefinite Integral

```
In [5]: Integral ( x **3 , x )
```
Out[5]: $\int x^3\,dx$

```
In [6]: integrate ( x **3 , x )
```
Out[6]: $\frac{x^4}{4}$

```
In [7]: Integral ( ln (x ), x )
```
Out[7]: $\int \log(x)\,dx$

```
In [8]: Integral(sin(x)**2)
```
Out[8]: $\int \sin^2(x)\,dx$

```
In [23]: integrate(sin(x)**2)
```
Out[23]: $\frac{x}{2} - \frac{1}{2}\sin(x)\cos(x)$

```
In [9]: integrate ( ln (x ), x )
```
Out[9]:

Simple One Dimension -- Definite Integral

Note that complex integrals take a while to run

```
In [10]: Integral ( x **3 , (x , 0 , 1))
```

Out[10]:

In [11]: `integrate ( x **3 , (x , 0 , 1))`

Out[11]:

In [12]: `Integral(x**2 * exp(x) * cos(x), x)`

Out[12]:

In [13]: `integrate(x**2 * exp(x) * cos(x), x)`

Out[13]:

In [14]: `Integral(exp(-x**2)*erf(x),x)`

Out[14]:

In [15]: `integrate(exp(-x**2)*erf(x),x)`

Out[15]:

Transforms -- Laplace and Fourier

In [16]:
```python
from sympy.integrals import laplace_transform
from sympy.abc import t,s,a
laplace_transform(t**a, t, s)
```

Out[16]:

In [17]:
```python
from sympy import fourier_transform, exp
from sympy.abc import x, k
fourier_transform(exp(-x**2), x, k)
```

Out[17]:

Multiple Integrals

In [18]:
```python
f = (x ** 2 + y ** 2)
Integral(f, (y, 20, x-2), (x, 22, 30))
```

Out[18]:

In [19]: `integrate(f, y,x)`

Out[19]: $\frac{x^3 y}{3} + \frac{x y^3}{3}$

In [20]: `integrate(f, (y, 20, x-2), (x, 22, 30))`

Out[20]:

In [21]:
```python
f = (x ** 2 + y ** 2+ z**2)
Integral(f, y,x,z)
```

Out[21]:

In [22]:
```python
f = (x ** 2 + y ** 2+ z**2)
integrate(f, y,x)
```

Out[22]: