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LeeSmithSBCC / Jupyter-Math-For-Nerds

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Jupyter-Math-For-Nerds / Jupiter-Files / MathWithSumpy\_SERIES\_LIMITS\_082918.ipynb

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LeeSmithSBCC Added Series-Limits

c7ef243 9 minutes ago

1 contributor

484 lines (483 sloc) 26.2 KB

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## Just about any math equation !!!

For **ADVANCED ALGEBRA**: sympy library in Jupyter Notebook allows you to:

- Series
- Limits
- Sum

```
In [1]: from sympy import *
        from __future__ import division
        init_printing()
```

```
In [2]: x, y, z = symbols("x, y, z")
```

```
In [3]: a, b, c, d = symbols('a b c d')
```

```
In [4]: # Simple Expansion -- LaTeX printing
        cos(x).series(n=10)
```

```
Out[4]: 1 - x2/2 + x4/24 - x6/720 + x8/40320 + O(x10)
```

```
In [5]: # Simple Expansion -- LaTeX printing
        sin(x).series(n=10)
```

```
Out[5]: x - x3/6 + x5/120 - x7/5040 + x9/362880 + O(x10)
```

```
In [6]: # Simple Expansion -- LaTeX printing
        (sin(x)*cos(x)).series(n=10)
```

```
Out[6]: x - 2x3/3 + 2x5/15 - 4x7/315 + 2x9/2835 + O(x10)
```

```
In [7]: # Simple Limit -- check syntax
        Limit(sin(x)/x, x, 0)
```

```
Out[7]:  $\lim_{x \rightarrow 0} \left( \frac{1}{x} \sin(x) \right)$ 
```

```
In [8]: # Simple Limit
        limit(sin(x)/x, x, 0)
```

```
Out[8]: 1
```

```
In [9]: # Simple Limit to INFINITY
        limit(1/x, x, oo)
```

```
Out[9]: 0
```

```
In [10]: # Confirm Syntax of Infinite Series Limit
        Sum(1/x**x, (x, 1, oo))
```

Out[10]:  $\sum_{x=1}^{\infty} x^{-x}$

```
In [11]: # Infinite Series Limit
Sum(1/x**x, (x, 1, oo)).evalf()
```

Out[11]: 1.29128599706266

```
In [18]: # Infinite Series Limit
N(Sum(1/x**x, (x, 1, oo)))
```

Out[18]: 1.29128599706266

```
In [12]: #Integral?
```

```
In [13]: Integral(sin(x))
```

Out[13]:  $\int \sin(x) dx$

```
In [14]: integrate(sin(x))
```

Out[14]:  $-\cos(x)$

```
In [15]: Derivative(x**2)
```

Out[15]:  $\frac{d}{dx} x^2$

```
In [16]: diff(x**2)
```

Out[16]:  $2x$

```
In [17]: # Calculate Expression from Symbols
expr = sin(x)/x
f = lambdify(x, expr)
f(3.14)
```

Out[17]: 0.0005072143046136395

