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Python Libraries

Library #2 : sympy

Sympy is an open-source Python library used for symbolic computations. This allows you deal with mathematical objects symbolically while representing objects exactly rather than approximately. While solving mathematical equations that use symbols SymPy displays unevaluated variables in symbolic from. It allows you to preform algebraic and mathematical calculations with ease. Variables in SymPy can only be used after they are defined using the symbols functions. Once symbols are defined SymPy makes it simple to create equations and evaluate them. It also has functions to format the output to display equations and formulas correctly (ex: printing the Integral symbol with limit).

SymPy's versatility allows it to be used across many platforms. In relation to physics, it gives the ability to evaluate formulas that deal with velocity, speed, time, etc. This could be beneficial for hypothesis testing that is studying the relations between variables. Another practical use for SymPy, that I would use myself as student studying Mathematical Science is the ability to check answers to complex mathematical problems. While studying for exams or even just practicing problems, having access to a program to test answers of any type allows you to create new problems and check if you solved it correctly. It is also a great way to integrate complex mathematics and programming.

Some functions of sympy:

Documentation: https://docs.sympy.org/latest/index.html

- symbols(‘x’) : allows you to declare symbols that can be used in equations
- integrate(f, x) : returns the indefinite integral of f based on x
- integrate(f, (x, a, b)) : returns the definite integral of f based on x by the limits from a to b
- Matrix([0, 0, 0], [0 , 0, 0]) : creates a new 2x3 matrix filled with zeros
- solve(f, x) : solves the equation f based on the variable x
- limit(expr, a, b) : returns the limit of the function expr by the limits from a to b