

py-dimensional-analysis

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This Python package addresses physical dimensional analysis. In particular, `py-dimensional-analysis` calculates from a given system of (dimensional) variables those products that yield a desired target dimension.

The following example illustrates how the variables mass, force, time and pressure must relate to each other in order to produce the dimension $\text{length} \cdot \text{time}$.

```
import danalysis as da

si = da.standard_systems.SI          # pre-defined standard units
with da.new_problem() as p:         # records variables and dimensions
    p.a = si.M
    p.b = si.L*si.M*si.T**-2        # or simply si.F
    p.c = si.T
    p.d = si.Pressure

    result = p.solve_for(si.L*si.T) # solve with target dimension
    print(result)
    # Found 2 independent variable products, each of dimension L*T:
    #   1: [a***-1*d**-1] = L*T
    #   2: [b**0.5*c*d**-0.5] = L*T
```

This library is based on [Szi07], and also incorporates ideas and examples from [San19, Son01].

1.1 References

- [San19] Juan G. Santiago. *A First Course in Dimensional Analysis: Simplifying Complex Phenomena Using Physical Insight*. MIT Press, 2019.

- [Son01] Ain A Sonin. Dimensional analysis. Technical report, Technical report, Massachusetts Institute of Technology, 2001.
- [Szi07] Thomas Szirtes. *Applied dimensional analysis and modeling*. Butterworth-Heinemann, 2007.