

## Optlang: An algebraic modeling language for mathematical optimization

**Jensen, Kristian; Cardoso, Joao; Sonnenschein, Nikolaus**

*Published in:*  
The Journal of Open Source Software

*Link to article, DOI:*  
[10.21105/joss.00139](https://doi.org/10.21105/joss.00139)

*Publication date:*  
2016

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Jensen, K., Cardoso, J., & Sonnenschein, N. (2016). Optlang: An algebraic modeling language for mathematical optimization. The Journal of Open Source Software. DOI: 10.21105/joss.00139

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Optlang: An algebraic modeling language for mathematical optimization

Kristian Jensen<sup>1</sup>, Joao G.R. Cardoso<sup>1</sup>, and Nikolaus Sonnenschein<sup>1</sup>

<sup>1</sup>The Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark

6 December 2016

**Paper DOI:** <http://dx.doi.org/10.21105/joss.00139>

**Software Repository:** <https://github.com/biosustain/optlang>

**Software Archive:** <http://dx.doi.org/10.5281/zenodo.228165>

## Summary

Optlang is a Python package implementing a modeling language for solving mathematical optimization problems, i.e., maximizing or minimizing an objective function over a set of variables subject to a number of constraints. It provides a common native Python interface to a series of optimization tools, so different solver backends can be used and changed in a transparent way.

Optlang's object-oriented API takes advantage of the symbolic math library SymPy (Team 2016) to allow objective functions and constraints to be easily formulated algebraically from symbolic expressions of variables. Optlang targets scientists who can thus focus on formulating optimization problems based on mathematical equations derived from domain knowledge.

Solver interfaces can be added by subclassing the four main classes of the optlang API (Variable, Constraint, Objective, and Model) and implementing the relevant API functions.

## References

Team, SymPy Development. 2016. "SymPy: Python Library for Symbolic Mathematics." doi:10.5281/zenodo.47274.