PeePyPoo

An Open-Source[1] Python Package for Modeling of Water Resource Recovery Facilities

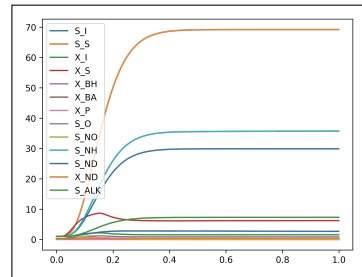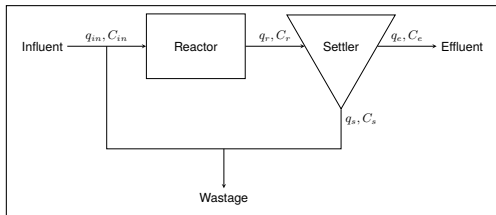**<u>Florian Wenk</u> and Andreas Froemelt, Eawag**

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[1]Available at https://gitlab.com/datinfo/PeePyPoo

PeePyPoo: Overview


```python
import numpy as np
import peepypoo
# System definition
influent=peepypoo.Systems.Static.Constant(...)
return_sludge_rate = peepypoo.Systems.Static.Constant(...)
pumprate = peepypoo.Systems.Static.Constant(...)
reactor = peepypoo.Systems.Dynamic.Continuous.Reactors.CSTR(...)
settler = peepypoo.Systems.Dynamic.Continuous.Settlers.SettlerTakacs(...)
unifier = peepypoo.Systems.Static.FlowElements.FlowUnifier(...)
pump = peepypoo.Systems.Static.FlowElements.FlowSeparator(...)
# System connection
influent.add_output_connection(unifier, [0, 1], [0, 1])
unifier.add_output_connection(reactor, [0, 1], [0, 1])
reactor.add_output_connection(settler, [0, 1], [0, 1])
settler.add_output_connection(pump, [0, 1], [2, 3])
pump.add_output_connection(unifier, [2, 3], [0, 1])
# Connect Parameters
return_sludge_rate.add_output_connection(settler, [2], [0])
pumprate.add_output_connection(pump, [2], [0])
```

Functionality

Framework for modeling WRRFs with following features:

- Flexible and modular
    - Different types of reactors/settlers are available and can be connected easily
    - Stoichiometry is entered directly using a table
- Performant
    - Equations are simplified to solve only necessary parts
    - Solution in Julia
- Transparent
    - All equations can be retrieved at every stage
- Directly written in Python/Julia
    - Can be integrated with any other Python/Julia Package, e.g. for including Data-Driven model parts

What are the benefits of Version Control Systems used in package development for the user?

- Different versions can be available simultaneously
    - E.g. development and release version
- Documentation can be automatically added
    - Provides info about installing, examples, API etc.
- Issues can be added
    - Notify developers about bugs, missing functionality etc.
- Automatic Tests can be set up
    - The developers can directly see if something goes wrong