西安交通大学

Ai4EComponentLib.jl

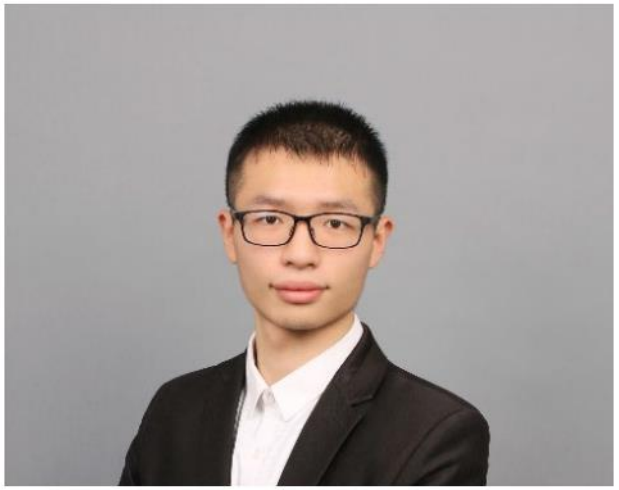
流程（工业）系统组件库

杨景懿

西安交通大学

2022年12月7日

个人简介



杨景懿

西安交通大学能源与动力工程学院，硕士研究生

研究方向：系统的建模、仿真、优化与控制

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邮箱：mingtao@mail.xjtu.edu.cn

一、背景简介

流程系统仿真

流程系统也被称为过程系统：描述工业生产中连续的或按一定程序周期进行的生产过程

有何共性?　　如何构建?

一、背景简介

流程系统仿真

图形界面

组件拓扑关系

方程组

待解格式

方程求解

SciML: Open Source Software for Scientific Machine Learning

方程组

方程化简

方程求解

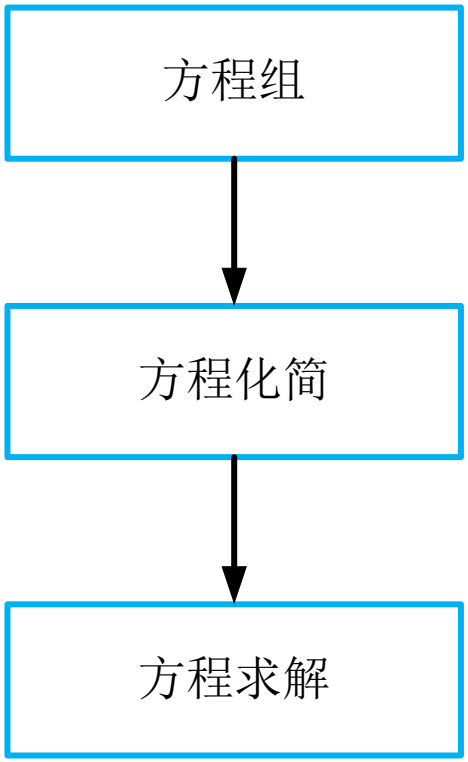
ModelingToolkitStandardLibrary.jl

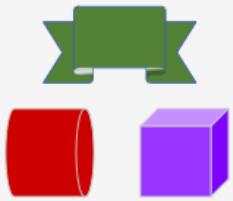
ModelingToolkit.jl

DifferentialEquations.jl

一、背景简介

流程系统仿真





Ai4EComponentLib.jl

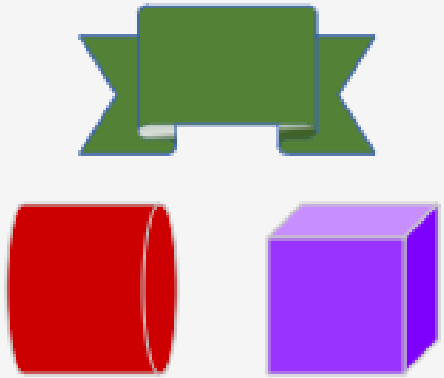
ModelingToolkit.jl

DifferentialEquations.jl

系统解耦与模块化

统一的组织范式

二、系统实例



Ai4EComponentLib.jl

电池组件库

暖通系统库

热力循环库

水力管网库

……

二、系统实例

SciML Scientific Machine Learning Showcase

The purpose of this page is to demonstrate the various applications where the SciML tools have been employed. If you would like your own work added to this list, please open a pull request.

External Applications Libr

There are many external libraries whic
an incomplete list of software organiz
you would like your institution's tools

- CliMA: Climate Modeling Alliance
- DJ4Earth: Differentaible Progran
- QuantumOptics
- New York Federal Reserve Bank
- Julia Robotics
- Julia Computing: JuliaSim
- Pumas-AI: Pharmaceutical Modeling and Simulation
  - SciML and Pumas-AI tools are an accepted standard by the FDA with trained evaluators
- Brazilian National Institute for Space Research (INPE)
  - Julia and the satellite Amazonia-1
- CMU+MIT+Citrine: Accelerated Computational Electrochemical Systems Discovery (ACED)
- Los Alamos National Lab: Model Analysis & Decision Support (MADS)
- ModiaSim: Modia.jl
- Safe Blues: A Method for Estimation and Control in the Fight Against COVID-19
- InSysBio: Heta Project QSP Simulation
- Trixi.jl: Adaptive high-order numerical simulations of hyperbolic PDEs in Julia
- Ai4EComponentLib.jl: An Component library of Energy and Power Engineering based on the ModelingToolkit acasual modeling system

Conversation 2 | Commits 1 | Checks 0 | Files changed 1

jake484 commented yesterday — Contributor

add an External Applications Library to showcase.md


Update showcase.md ··· Verified 0f4b0af

ChrisRackauckas commented yesterday — Member

This is very cool! Thanks for sharing. Can you also open a PR to ModelingToolkit.jl to add it as a downstream test? Seems like it would be a good thing to have somewhere in the test suite.

三、应用案例

基于工业互联网的电解铝厂空气压缩系统节能管理

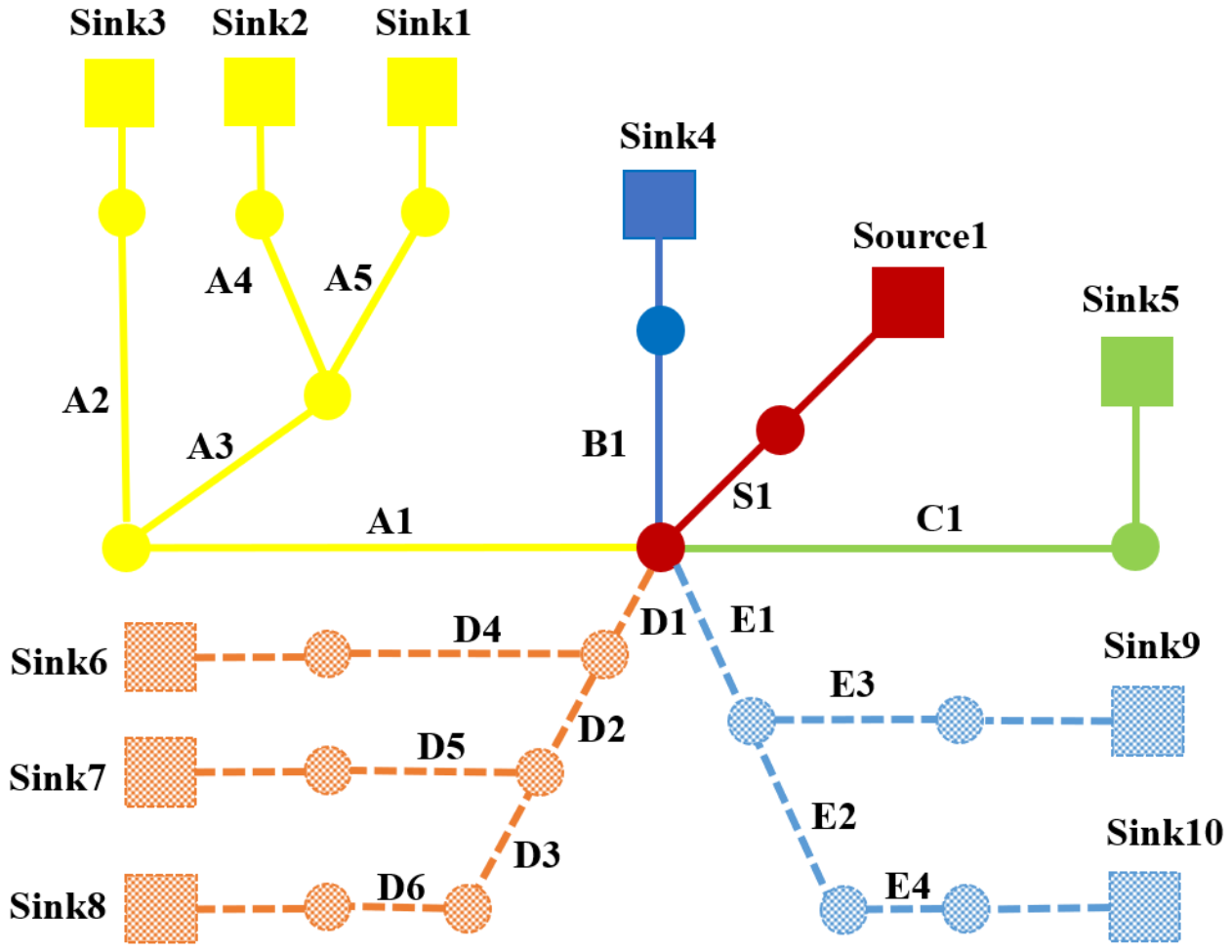
图片来自网络

空压站 → 输气管道 → 工艺车间

产气　　送气　　用气

三、应用案例

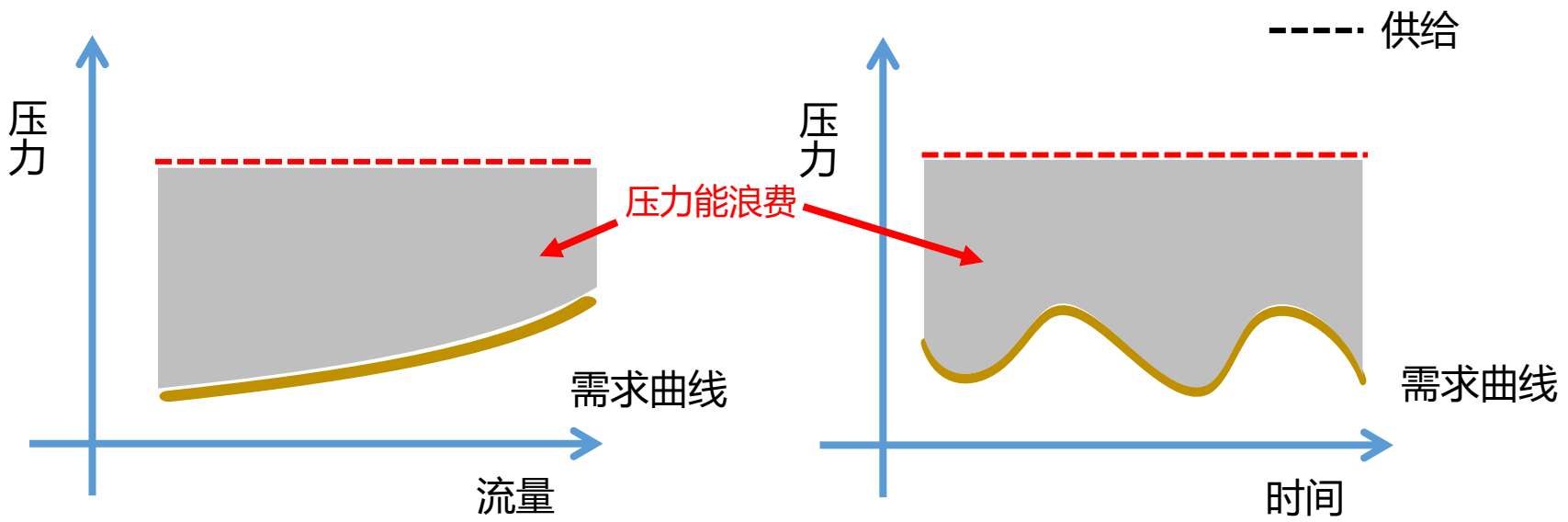
基于工业互联网的电解铝厂空气压缩系统节能管理

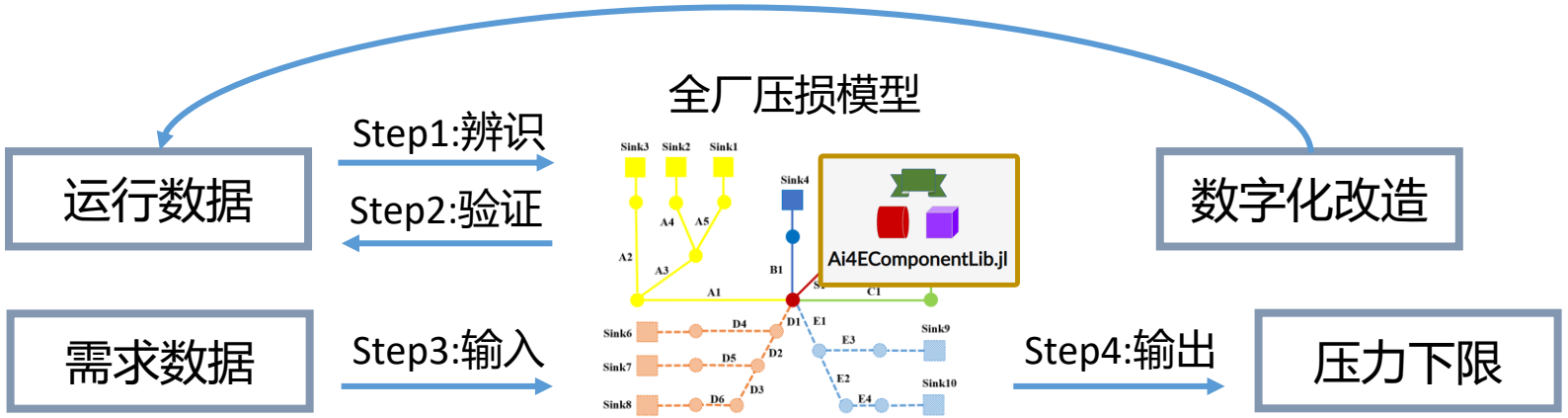


Source1：压力源
Sink1：一段管车打料点
Sink2：二段管车打料点
Sink3：三段管车打料点
Sink4：阳极组装车间
Sink5：电解车间
Sink6：原材料仓库
Sink7：台包车间
Sink8：检修车间
Sink9：阴极浇筑车间
Sink10：铸造车间

三、应用案例

基于工业互联网的电解铝厂空气压缩系统节能管理





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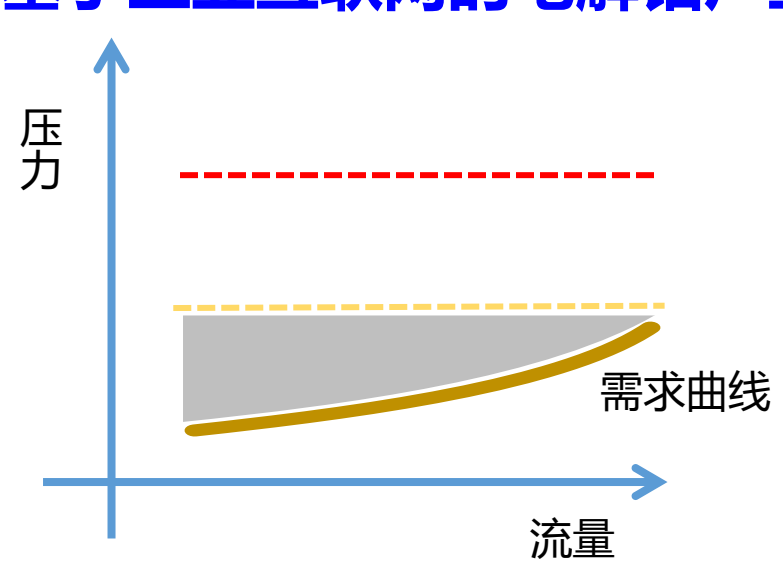
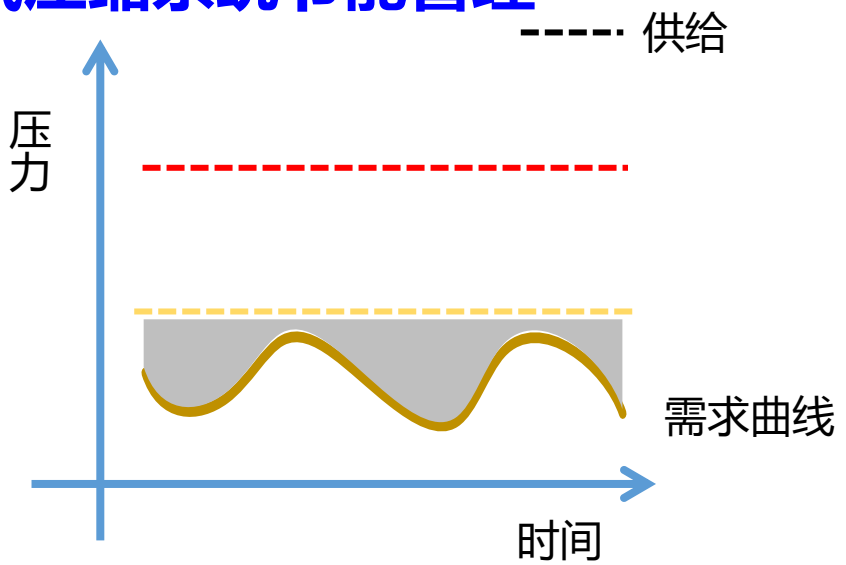
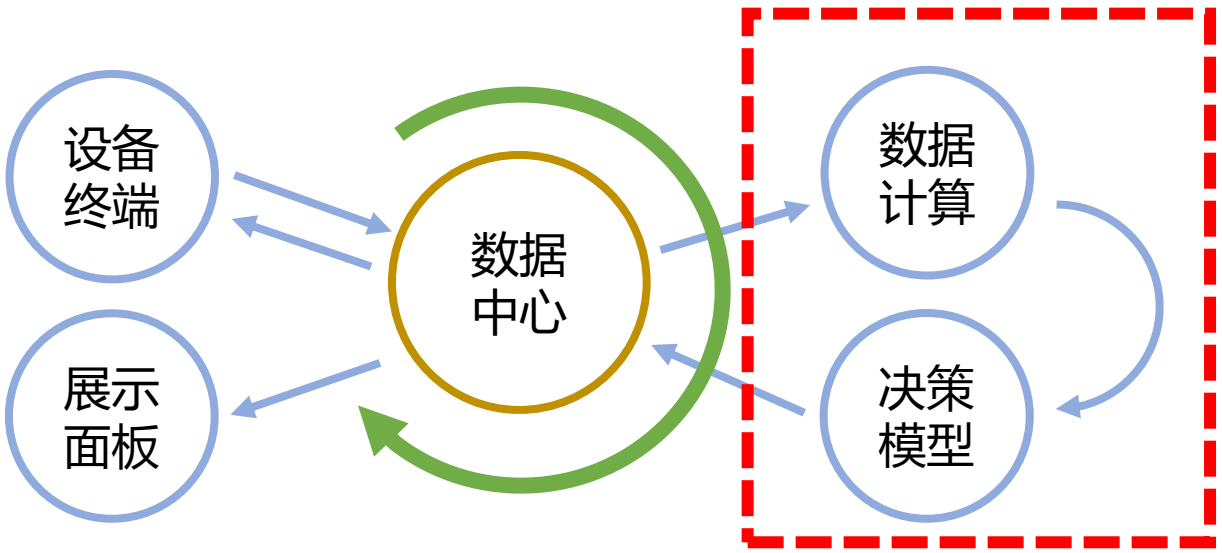
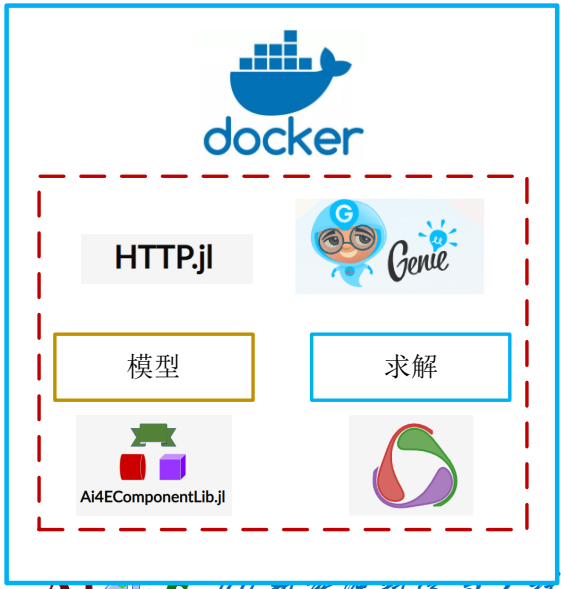


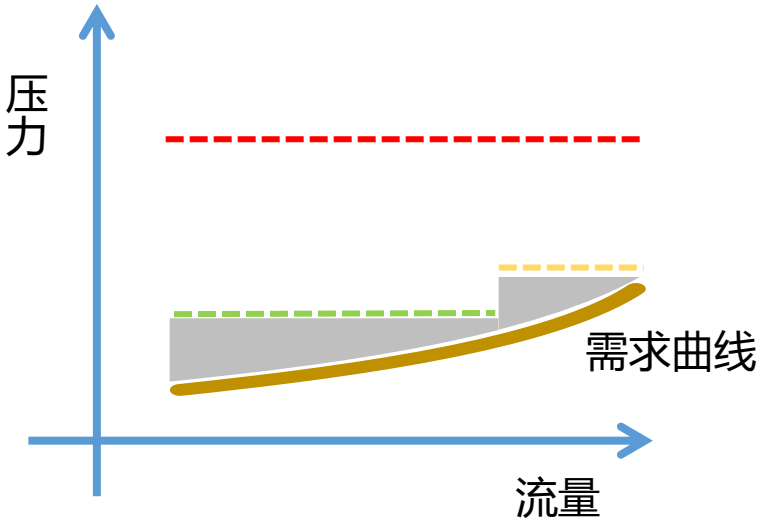


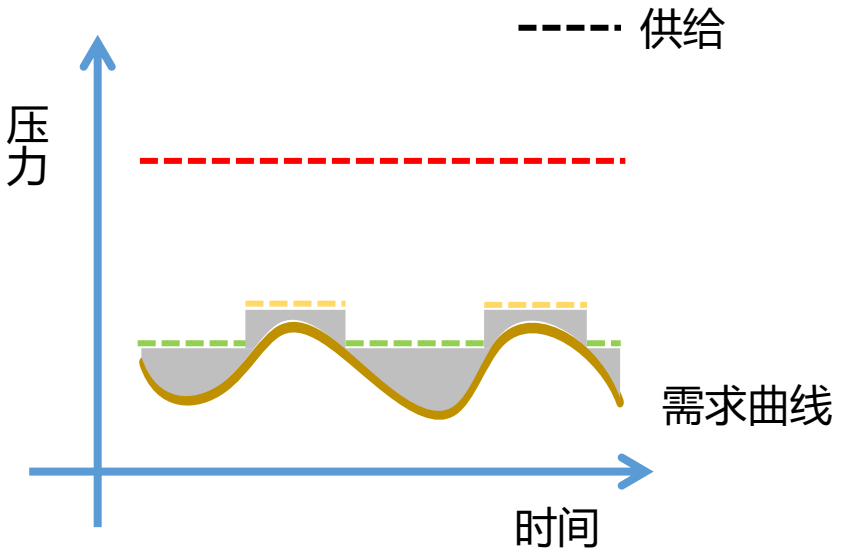


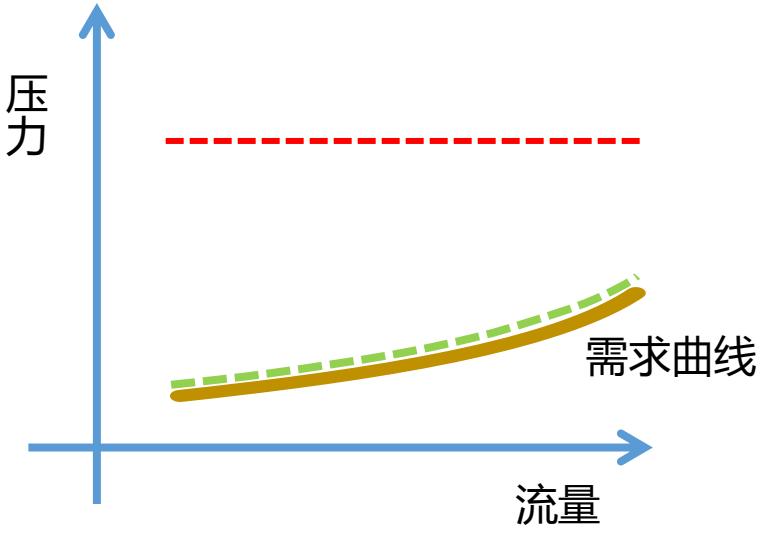


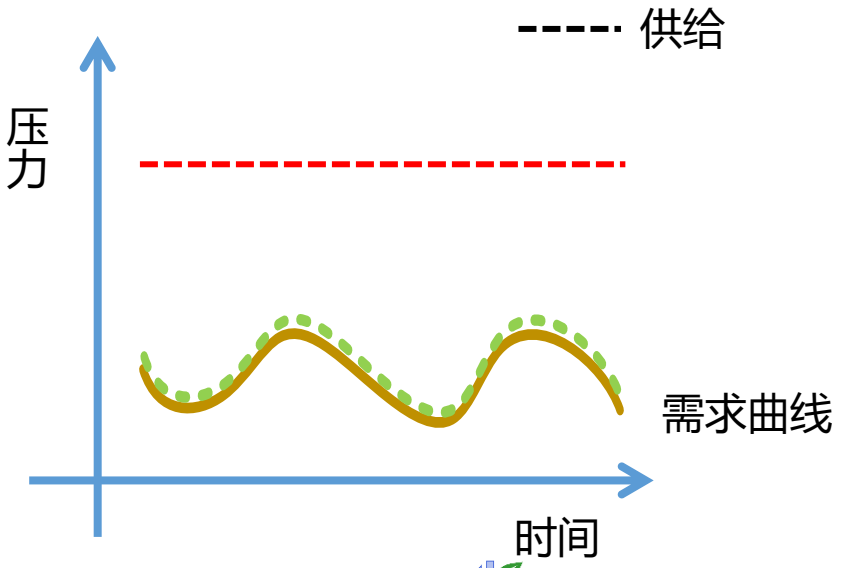
三、应用案例

基于工业互联网的电解铝厂空气压缩系统节能管理



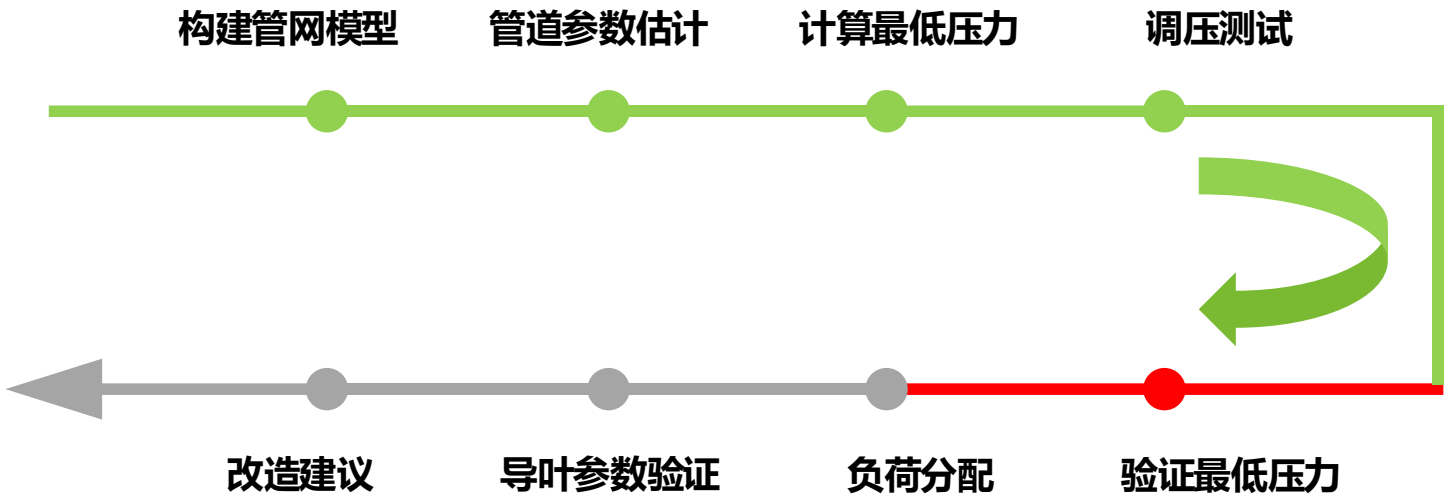




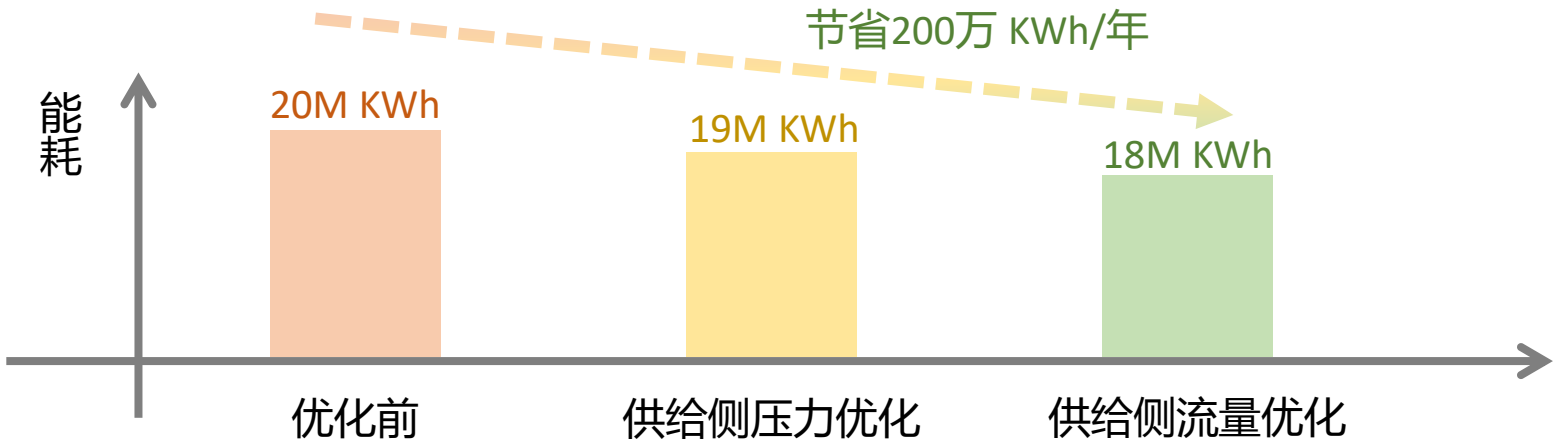


三、应用案例

节能路径



节能效益



四、架构简介

Ai4Energy

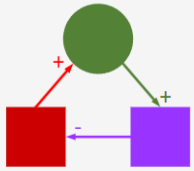
智慧能源与碳中和开源组织-始于xjtu

11 followers · China · http://ai4energy.github.io

Overview | Repositories 20 | Projects | Packages | Teams | People 5 | Settings

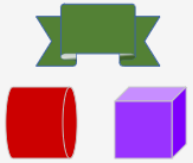
README.md

Ai4Energy: 致力于发展智慧能源开源软件



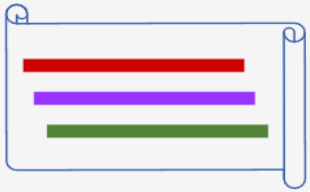
OptControl.jl

Ai4EMetaPSE.jl



Ai4EComponentLib.jl

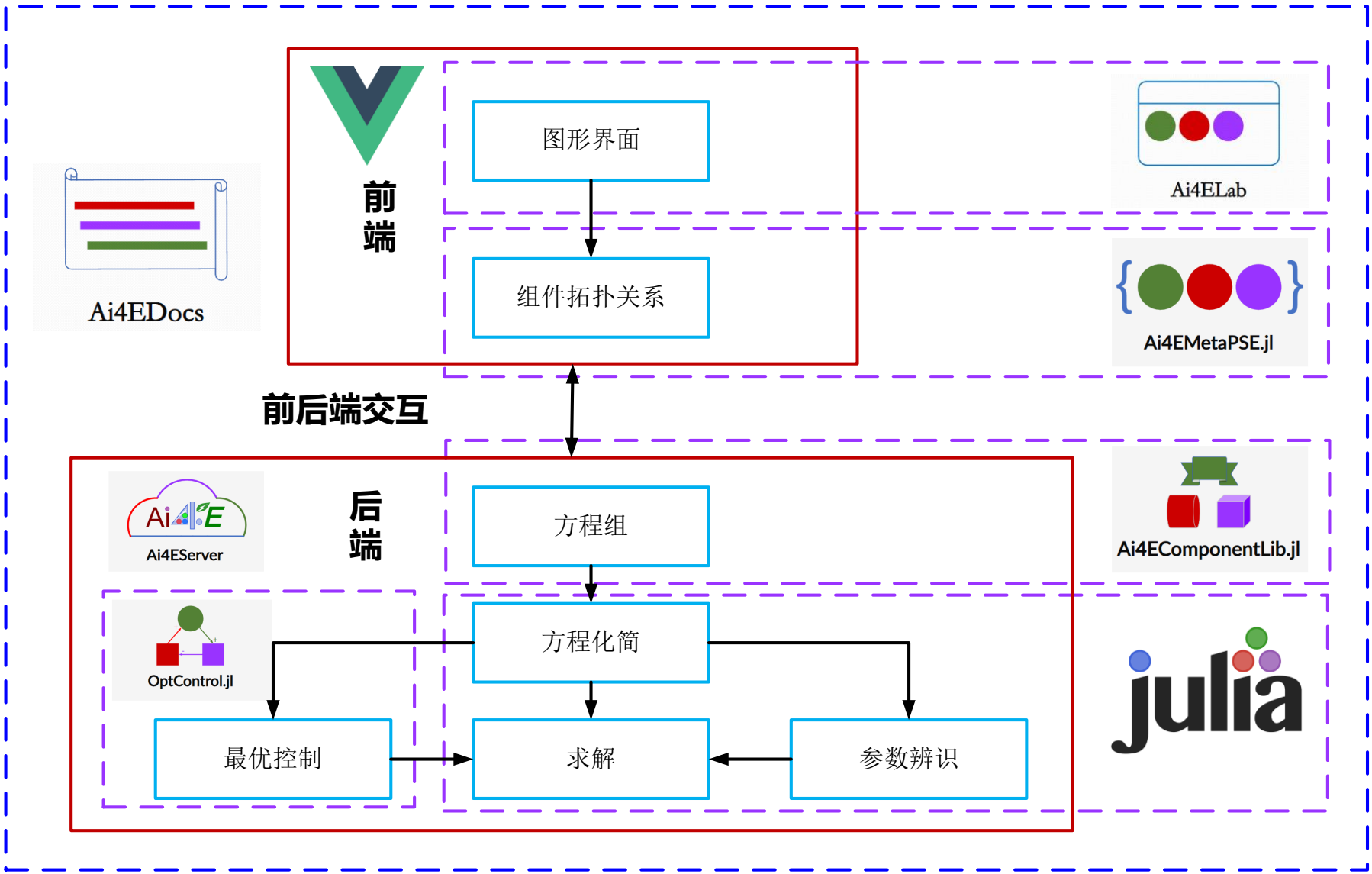
Ai4ELab



Ai4EDocs

Ai4EServer

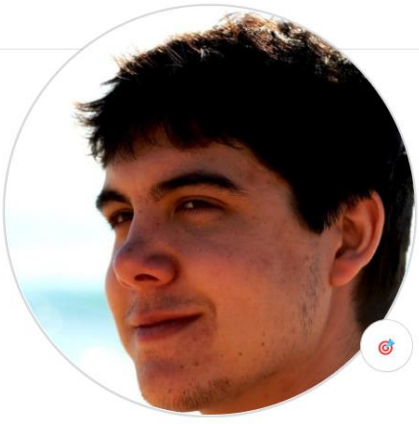
四、架构简介


前端
图形界面
组件拓扑关系
Ai4EDocs
Ai4ELab
Ai4EMetaPSE.jl
前后端交互
后端
Ai4EServer
方程组
Ai4EComponentLib.jl
OptControl.jl
方程化简
julia
最优控制
求解
参数辨识

五、心得分享

致谢！

Yingbo Ma
YingboMa



Christopher Rackauckas
ChrisRackauckas

when solving,error comes.

```
ERROR: LoadError: The nonlinear solver failed with the return code MAXITERS_EXCEED.
```

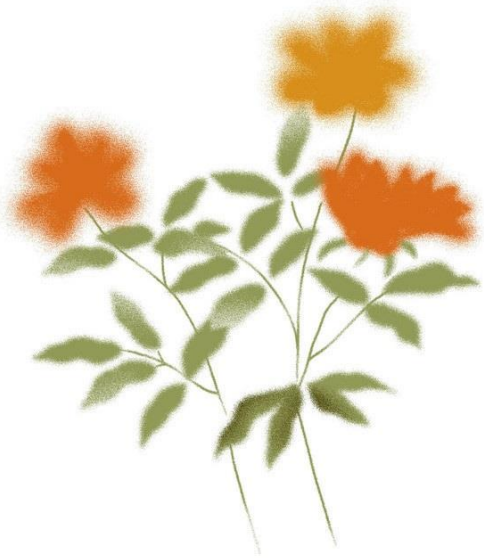
it's something wrong with solver? or I chose an unsuitable solver?

YingboMa commented on 19 Nov 2021 Member

方程不收敛亲，换个初值试试~~这个问题我要Close了喔！

The inlined nonlinear solver failed to converge, so you should try to change the default values.

Also, please provide a MWE with a full stack trace. There is not enough information to say anything here, so I am going to close this issue for now.



欢迎提问