
lqgbt-nse Documentation

Release 1.0.0

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This is a Python module for application of LQG-balanced truncation for low-order controllers for the stabilization of Navier-Stokes

As an example we consider the stabilization of the cylinder wake at moderate Reynoldsnumbers via distributed control and observation.

To get started, install all dependencies, download the code from the linked github repository, create the subdirectory *data*, and run `compscript.py`. Since the problem already is unstable, the Newton-ADI iterations will not simply converge. You will need to compute stabilizing initial guesses first. Therefore, uncomment the respective line in the header of `compscript.py`.

Dependencies:

- `numpy` and `scipy` (v0.13)
- `dolfin` (v1.3)
- `dolfin_navier_scipy`
- `sadptprj_riclyap_adi`
- `distr_control_fenics`

Alternatively:

If you have `dolfin` and `scipy` installed, all you need is in tar file attached to the github release `v1.0-lqgbtpaper`.

Contents:

1.1 lqgbt_Inse

1.2 nse_riccont_utils

1.3 nse_extlin_utils

`nse_extlin_utils.get_get_cur_extlin` (*vinf=None, V=None, diribcs=None, invinds=None, reducedmodel=False, tl=None, tr=None, picrdvsnwtm=0.0, amat=None, akmat=None, **kwargs*)

returns a function to compute the current extended linearization

Parameters — `vinf`: array

the set point

use_ric_ini [string, optional] path to a stabilizing initial guess

CHAPTER 2

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