Current main files

main\_hvac\_model\_manualdist\_1zone.m: This one generates disturbances manually so that Simulink model loads them. Implements differences throughout the week. Performs comparison between ASMPC, SMPC and MPC (MPC is the same SMPC but with tightening parameters equal to zero and not performing adaptation)

Calls the following design methods

design\_MPC\_hvacmb\_1z\_v4: designs ASMPC (and same file can be used for SMPC and MPC)… optimizes mdots, u=DT\*mdots, delta=fixed

Calls the following Simulink models

hvac\_maborrelli\_singapur\_1zone\_with\_MPC\_v3\_manualdist\_ofice: calls ASMPC (or variations)

-> mpc\_sfunc\_1zone\_v4 (performs mpc optimization)

->cv\_counter\_sim.m (adaptive law and counts violations)

-> maborrelli\_sfunc\_1zone

-> dynamics\_hvac\_maborrelli\_singapur\_1zone

hvac\_maborrelli\_singapur\_1zone\_with\_RBC\_manualdist\_ofice: implements rule based controller

-> RBC\_sfunc\_1zone\_v4c (rbc control law)

->cv\_counter\_sim.m (counts violations)

-> maborrelli\_sfunc\_1zone

-> dynamics\_hvac\_maborrelli\_singapur\_1zone

main\_hvac\_model\_manualdist\_nzones.m: This one generates disturbances manually so that Simulink model loads them. Implements differences throughout the week. For nzones

Calls the following design methods

design\_MPC\_hvacmb\_nz\_v4: designs ASMPC (and same file can be used for SMPC and MPC)… optimizes mdots, u=DT\*mdots, delta=fixed, since it uses the same change of variables at each node, must make sure that DT is the same, so it imposes that as a nonlinear constraint, thus solves a nonlinear program

Calls the Simulink models

hvac\_maborrelli\_singapur\_nzone\_with\_MPC\_v3\_manualdist\_ofice: calls ASMPC (or variations)

-> mpc\_sfunc\_nzones\_v4 (performs mpc optimization)

-> cv\_counter\_sim\_nz1z.m (adaptive law and counts violations in the case of nzones, each box handles one zone)

-> maborrelli\_sfunc\_nzones

-> dynamics\_hvac\_maborrelli\_singapur\_nz

main\_hvac\_model.m: only the average disturbance sequence is generated, and an un-explicit Simulink model is called. No difference through the week. But can choose different MPC designs

Calls the following design methods

design\_MPC\_hvacmb\_1z (fully linearlized)\*

Executed with hvac\_maborrelli\_singapore\_1zone\_with\_MPC

->mpc\_sfunc\_1zone

->maborrelli\_sfunc\_1zone

design\_MPC\_hvacmb\_1z\_v2 (u\_opt=mdots, DT chosen so that Ts=15, delta=fixed)

Executed with hvac\_maborrelli\_singapore\_1zone\_with\_MPC\_v2

->mpc\_sfunc\_1zone\_v2

->maborrelli\_sfunc\_1zone

design\_MPC\_hvacmb\_1z\_v3 (u\_opt=(uroom,uin), delta=fixed\*

Executed with hvac\_maborrelli\_singapore\_1zone\_with\_MPC\_v3

->mpc\_sfunc\_1zone\_v3

->maborrelli\_sfunc\_1zone

design\_MPC\_hvacmb\_1z\_v4 (incompatible with this old main file)

main\_hvac\_basic.m: only the average disturbance sequence is generated, very “mysterious file haha”

\*check these methods: I have been linearizing the wrong way, so maybe this explains the poor performances

Current Model files

maborrelli\_sfunc\_1zone, maborrelli\_sfunc\_nzones

Updates 14 february

New Simulink model

hvac\_thc\_singapore\_nzones\_with\_MPC\_manualdist\_office.mdl

Calls update model

thc\_sfunc\_nzones.m, which calls the dynamics dynamics\_hvac\_thc\_singapur\_nz.m

The new main file is called main\_hvac\_thc\_manualdist\_nzones.m

For nzones

design\_MPC\_hvacmb\_nz\_v4 Nonlinear change of variables – Only temperature

design\_MPC\_hvacmb\_nz\_v5 Nonlinear change of variables – Temperature and CO2