

IBPSA Project 2 Expert Meeting

Task 3: Test Cases

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Task 3: Test Cases, Session 1

Updates to current test cases

All test cases

- Added activate “<input>_activate” signals to test cases documentation

BESTEST Air and BESTEST Hydronic

- Change cooling setpoint "con_oveTSetCoo_u" min and max from [23 30] to [5 35] and heating setpoint from [15 23] to [5 35]. This is to avoid unreasonable limits for controllers.

BESTEST Hydronic and BETEST Hydronic Heat Pump

- Change dependency by removing them from IDEAS library and moving them to BOPTEST repository. This will help update and maintain the models more easily.

Multizone Office Simple Air

- Correct typo in documentation for cooling setback from 12 to 30.

Task 3: Test Cases, Session 1

Updates to current test cases

Multizone Residential Hydronic

- Update Modelica code so that overwrite input "oveTSetPum" to "oveTSetPumBoi" so that this set point change will control thermostat activating both the boiler and the circulation pump. This allows supervisory control of the HVAC with only set points.
- Pump baseline control logic is changed from PI following error on set point to on/off depending on thermostat control signal. This helps simplify baseline controller making numerical simulation faster and more robust.
- A safety on boiler control is added, allowing it to turn on only if there is flow through the boiler. This safety is bypassed if controlling the boiler directly via "boi_oveBoi_u". This makes baseline controller safer and more robust. However, if low lever control is implemented by supervisory algorithm it could crash the simulation.

Task 3: Test Cases, Session 1

Updates to current test cases

Single zone commercial hydronic

- Hydronic system:
 - Added piping segments in hydronic system to increase thermal delay
 - Resized valves and switched to two-way valves
 - Switched to pressure driven pump in hydronic system
 - Switched DH heat exchanger from constant effectiveness to plate HX model
- Ventilation:
 - Added internal control of rotary heat exchanger
 - Linked control of supply and extract fan for baseline controller

Task 3: Test Cases, Session 1

Updates to new test cases

- Large Office [Yan, Xing]

No news. Need 2025 budget to start working on it again. Ettore will take a look at $t = 0$ initialization error.

- Twozone Apartment Hydronic [Ettore]

No updates. Two zone model with DER and storage was developed in a separate effort.

- DTU emulators [Matthias]

No updates. They are going to do experimental campaign on the real buildings and hopefully start development

- ETS emulator [Kun]

No updates, Ali still waiting on Visa.

Task 3: Test Cases, Session 1

New test cases Ideas and Contributions

Open discussion:

- What test cases do you think are missing?
- Who wants to contribute a new test case?

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Changing the test case naming scheme

ID_<building_type>_<n>zones_<hvac_system>_<location>

ID: Unique identifier of test case, could be number, could be word

<building_type>: residential,commercial,industrial, district

<n>zones: Number of thermal zones

<hvac_system> : have unique tags to identify VAV, FCU, RAD, RADF...

<location>: city-country

The composition of these values could make up the name of the test case

Task 3: Test Cases, Session 1

Changing the test case naming scheme

Previous name	Proposed name
BESTEST Air	TC1_BESTEST900_commercial_1zon_FCU_Denver-USA
BESTEST Hydronic	TC2_BESTEST900_residential_1zon_RAD_Brussel-Belgium
BESTEST Hydronic Heat Pump	TC3_BESTEST900hp_residential_1zon_RAD-AWHP_Brussel-Belgium
Single zone commercial Hydronic	TC4_University001_commercial_1zon_RAD-AHU_Copenhagen-Denmark
Two Zone Apartment Hydronic	TC5_Apartment001_residential_2zon_RADF-AWHP_Milan-Italy
Multizone Residential Hydronic	TC6_Singlefamily001_residential_6zon_RAD_Bordeaux-France
Multizone Office Simple Air	TC7_Office001_commercial_5zon_VAV_Chicago-USA
Single Zone Commercial Air	TC8_Retail001_commercial_1zon_VAV_NewYorkCity-USA
Flexible Research Platform	TC9_Testbed001_commercial_10zon_VAV_Tennessee-USA
Multizone Office Simple Hydronic	TC10_Office002_commercial_2zon_FCU-AWHP_Brussel-Belgium
Multizone Office Simple Hybrid	TC11_Office003_commercial_27zon_TABS-AHU-GSHP_Dilbeek-Belgium
Multizone Office Complex Air	TC12_Office004_commercial_5zon_VAV_Chicago-USA