DIN - DEPARTMENT OF INDUSTRIAL ENGINEERING

PhD Course in Mechanics and Advanced Engineering Sciences (DIMSAI)

PHD STUDENT POSTER - AY *2016/2017* **Curriculum number *3*** **Cycle *XXXII***

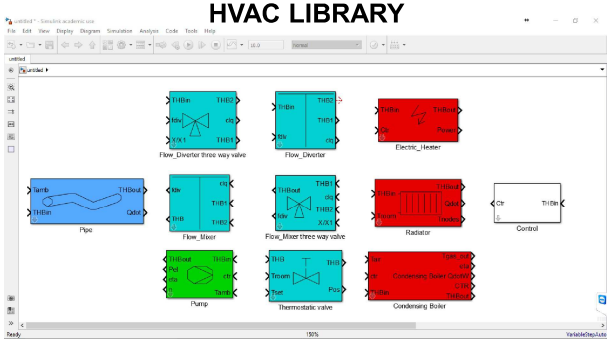
Candidate: *Mara Magni* **Supervisor:** *Gian Luca Morini*

Numerical and experimental characterization of the performances of a dual source heat pump by means of Whole System Testing (WST)

ALMABuild: AN OPEN SOURCE SIMULINK BLOCKSET

Dynamic modelling of the main HVAC elements (i.e. pump, pipes, heat sources, etc…) and of the building components.

HVAC LIBRARY

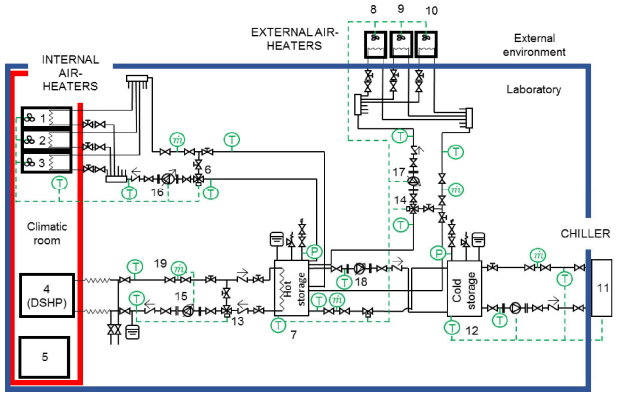


BUILDING LIBRARY

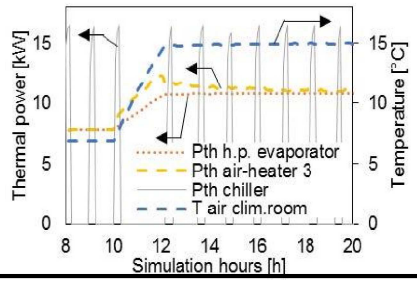
HiL CLIMATIC ROOM FOR HEAT PUMPS

A climatic chamber has been designed with the aid of dynamic simulations made by ALMABuild and Trnsys.

SCHEMATIC OF THE CLIMATIC ROOM



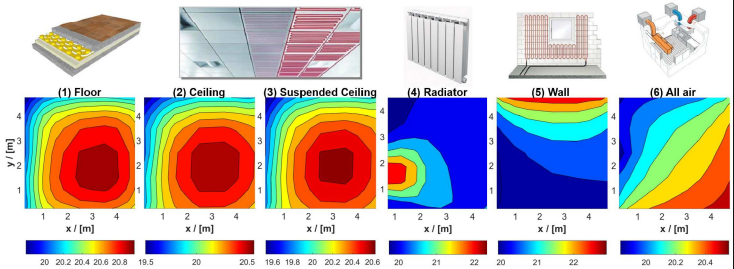
ANALYSIS OF THE OFF-DESIGN CONDITIONS OF THE TEST ROOM



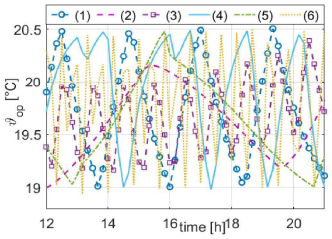
RADIATIVE EXCHANGE

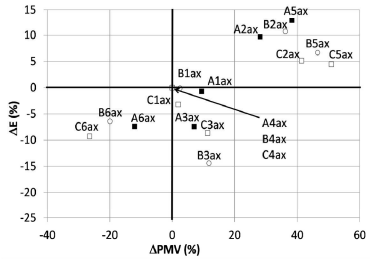
A detailed model of the radiative exchange between the surfaces of a room has been developed in MATLAB.

3D MEAN RADIANT TEMPERATURE DISTRIBUTION IN A ROOM AS A FUNCTION OF THE HEATER



DYNAMIC BEHAVIOUR OF DIFFERENT HEATERS





ENERGY DEMAND AND COMFORT PARAMETERS AS A FUNCTION OF THE ENVELOPE INSULATION LEVEL

FUTURE WORK:
- Modelling of a dual source heat pump and optimization of its control strategy
- Set up of the climatic chamber

ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA
IL PRESENTE MATERIALE È RISERVATO AL PERSONALE DELL'UNIVERSITÀ DI BOLOGNA E NON PUÒ ESSERE UTILIZZATO AI TERMINI DI LEGGE DA ALTRE PERSONE O PER FINI NON ISTITUZIONALI