

# *Energy simulation tools for early stage design of buildings*

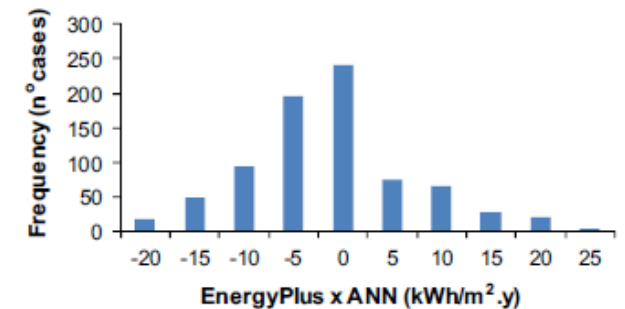
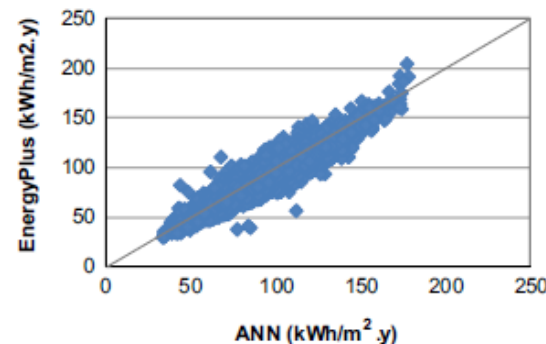
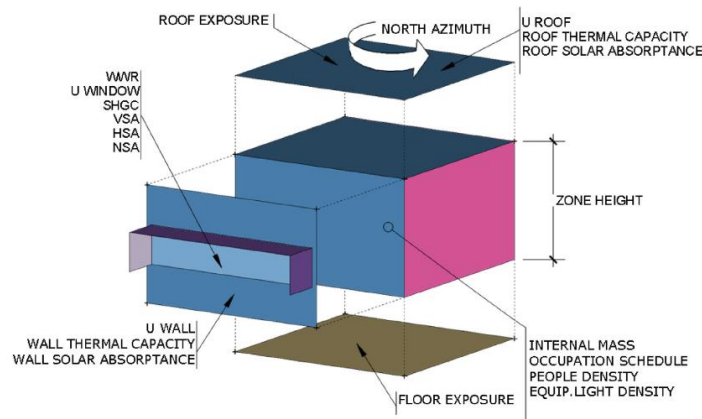
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# Researches

- Brazilian Regulation for Energy Efficiency Labelling of Commercial and Residential Buildings
  - Thesis: *Development of a method to predict building energy consumption through an artificial neural network approach*
    - Metamodel (sampling technique - Latin Hipercube Method; and statistical modelling technique - artificial neural network)
    - Weather file: Florianópolis
    - Number of cases: 3.200



# Researches

- PostDoc: *Development of a metamodel to predict building energy efficiency level of the building envelope*
  - Metamodel (sampling technique - Latin Hipercube Method; and statistical modelling technique - artificial neural network)
  - R program
  - Number of cases: 1 milion (cluster)
  - Climatic Brazilian zones: 24 (INMET 2016)
  - Influence of each input data in the output data (cooling and heating thermal load)
  - Validation process

# Next step

- A multi-stage simulation-based optimization method to find zero energy building
  - Deliver fast results to designers to assist in the decision making process;
  - Define a methodology to simplify the building description and able to convert a detailed building model into a simplified model requiring only a limited number of inputs;
  - Identify which design factors has the highest impact on energy use relative to the others.
- *Benefits:*
  - Decisions at earlier phases of the design have a bigger impact on the building performance than measures taken at later design stages or during building operation;
  - A more efficient use of building performance simulations during the early design stage would be very beneficial for the end result.

*Thank you for your attention!*

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