THE INFLUENCE OF THERMOCHROMIC GLAZING PARAMETERS ON ENERGY SAVING AND COMFORT CRITERIA USING MOMENT-INDEPENDENT MEASURE

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To cite this version:

Arthur Ah-Nieme, Bruno Malet-Damour, Dimitri Bigot, Stéphane Guichard, Harry Boyer. THE INFLUENCE OF THERMOCHROMIC GLAZING PARAMETERS ON ENERGY SAVING AND COMFORT CRITERIA USING MOMENT-INDEPENDENT MEASURE. Assemblée Générale du laboratoire PIMENT 2017, Nov 2017, Petite-île, Réunion. hal-01654443

HAL Id: hal-01654443
https://hal.univ-reunion.fr/hal-01654443
Submitted on 4 Dec 2017

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**AIM OF THE STUDY**

Identify the influence of thermochromic glazing parameters for office buildings in hot climates using dynamic building simulations and sensitivity analysis techniques.

**BACKGROUND**

**Thermochromic glazing (TC):**
Has the capability to modulate its thermo-optical properties dynamically and reversibly when a change in its temperature occurs.

**TC glazing for building application**
- Has to be doped with other metals to improve its properties: (Li and al., 2012)
  - Transition temperature
  - Visible Transmittance
  - Solar modulation
- Has a potential to:
  - Reduce energy consumption (Hoffmann et al., 2014)
  - Improve thermal and visual comfort (Costanzo and al., 2016)
- Has a greater efficiency for hot climates (Saeli and al., 2010)

**METHODOLOGY**

- Thermal and daylighting simulations with EnergyPlus
- Sensitivity analysis method with a Python code with the SAIlb
- Analysis on several indexes and on 4 locations (hot tropical climates)

**SENSITIVITY ANALYSIS**

**Moment-Independent Measure** (Borgonovo, 2007):
The assessment of “the influence of the entire input distribution on the entire output distribution without reference to a particular moment of the output”

**RESULTS**

**Normalized outputs**

**Energy consumption index ($I_{ec}$):**
- Sum of the final energy consumed in one year
- Cooling and artificial lighting

**Thermal comfort index ($I_{th}$):**
- % of time when the operative temperature is below 26°C

**Visual comfort index ($I_v$):**
- % of time when the illuminance reference points are between 300 and 2000 lux

**REFERENCES**


