Use of Random Number Generator and a Simplified Building Thermal Model for the Optimization the Energy Consumption

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Objectives

- *Maintain* ***Thermal Comfort.***
- *Minimize* ***Energy Bill.***
- *Minimize* ***Energy Consumption.***
- *Achieve* ***Load Shedding.***

$$\min G_i = \sum_{k=1}^{K} c_i(k) \times \alpha_i(k) \times P_{max} \times \Delta t$$

Where $\alpha_i(k) \in \left[\frac{1}{M} ; \frac{M-1}{M}\right]$ is a random number.

Condition I : Thermal Comfort.

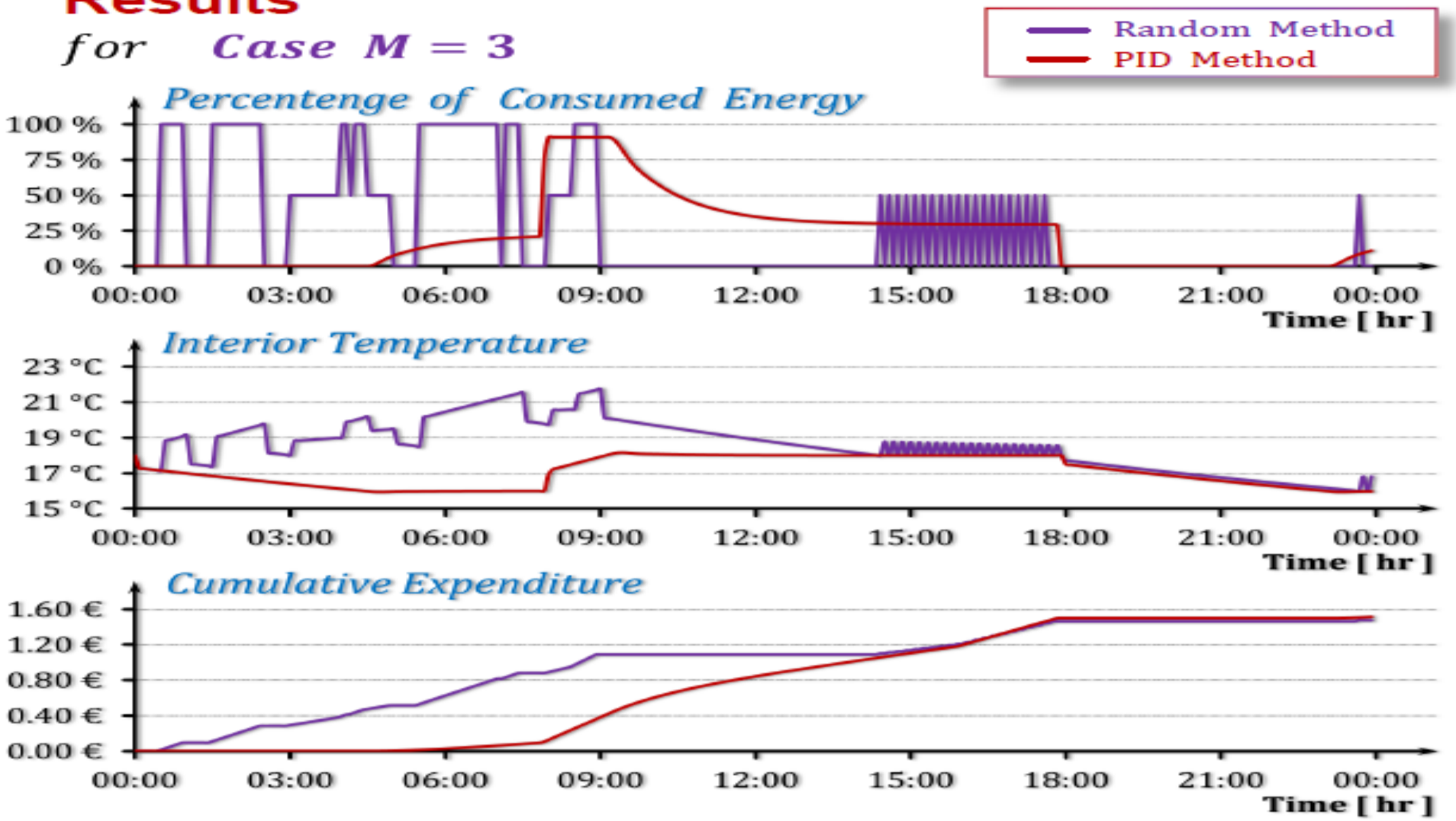
$$T_{i\ (min)}(k) \leq T_i(k) \leq T_{i\ (max)}(k)$$

Condition II : Limited Power Source.

$$\sum_{i=1}^{n} P_i(k) \leq P_{max} \iff \sum_{i=1}^{n} \alpha_i(k) \leq 1$$

Results

for ***Case M = 3***



€ → Saving up to **2.6 %**
Comparing with the PID method