

## عنوان مقاله:

The effect of using smart shadings on the thermal and visual performances of buildings in Iran: A numerical simulation

## محل انتشار:

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## خلاصه مقاله:

This paper presents controlling and optimizing the energy performance of buildings using smart shadings. Simulations are carried out using EnergyPlus and multi-objective optimization is performed by jEPlus+EA through NSGA-II algorithm. Optimization of control strategies is performed for a typical office room on the middle floor of a building in Tehran. Slat angle, solar radiation, and the material of smart windows are selected as decision variables. Also, the annual total building energy consumption, the predicted percentage of dissatisfaction (PPD), and the discomfort glare index (DGI) are considered as three objective functions minimized simultaneously. The weighted sum method to select the final answer of Pareto solutions is used. In the first strategy, a comparison of the results of optimization with the initial values when the angles of slats are constant and equal to  $45^\circ$  showed that the total annual energy consumption, DGI, and PPD indexes reduced up to 11.74%, 6.4%, and 46.6%, respectively. In the second strategy, the reductions were 28.73%, 56.5%, and 34.05%, respectively, in comparison with the double-glazing window. The results clearly show how the correct selection of architectural parameters and control strategies can greatly prevent energy losses while providing the thermal and visual comfort of the building occupants.

## کلمات کلیدی:

Shading control strategy, Multi-objective optimization, Thermal comfort, visual comfort, Building energy simulation

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1855101>

