

this metric, and the Hypervolume keeps steady around 0.75 after half of the generations.



Figure 6. The evolution of optimal solutions every 10 generation

Some optimal solutions of Pareto front in every 10 generation (Figure 6) intuitively show the evolution processing of optimization. Obviously, the difference among Pareto solutions are kept throughout the whole process, and the diversity gives more freedom and flexibility for design.

CONCLUSION

This paper proposes an approach for envelope optimization in terms of three objectives involving total energy consumption, envelope capital cost and $UDI_{100-2000}$. The generation and control of geometric variables, co-simulation of EnergyPlus and Daysim and optimization process are all achieved in the Grasshopper platform. The quality of Pareto set is evaluated from three aspects: convergence, spread and uniformity. Besides, some issues still need to be deeply discussed, including the unevenly distribution of optimal objectives and quantitative assessment of the quality of every aspect.

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