In this study, with the aim of realizing the prediction of periodic and spatial indoor thermal environment and analyzing energy consumption in a ZEB criterion office model with Liquid cooling air-conditioning system, the method of embedding contribution ratio of indoor climate (CRI) model into the network model was used.

**Purpose**

**Network Model**
- Solving the time variation of boundary conditions of building envelope, performance of air-conditioning equipment etc.
- Fluctuation over time of heat transfer of building envelope
- Fluctuation over time of performance of air-conditioning equipment

**Contribution Ratio of Indoor Climate (CRI) Model**
- Solving the spatial distribution elements under the quasi-steady state

**Fig. 1 Simulation method**

**Fig. 2 Configuration of terminal equipment, processing load, control Signal in liquid cooling air conditioning system**

**Fig. 3 Calculation flowchart of Periodic & Spatial PMV**
Simulation on Periodic & Spatial Indoor Thermal Environment & Energy in Buildings  
Part II

Fig. 1 The ZEB criterion office model with Liquid Cooling air-conditioning system

Fig. 2 Relationship between PMV fluctuation over time with control of chilled water of ACB (Active chilled beam)

Fig. 3 PMV frequency distribution and cumulative probability density over cooling period and all occupants

Fig. 4 % of PMV in the comfortable range of each occupant over cooling period

Fig. 5 Energy consumption of each air-conditioner over cooling period

Spatial and Periodic Simulation of Indoor Thermal Environment with Considering the Control of HVAC system