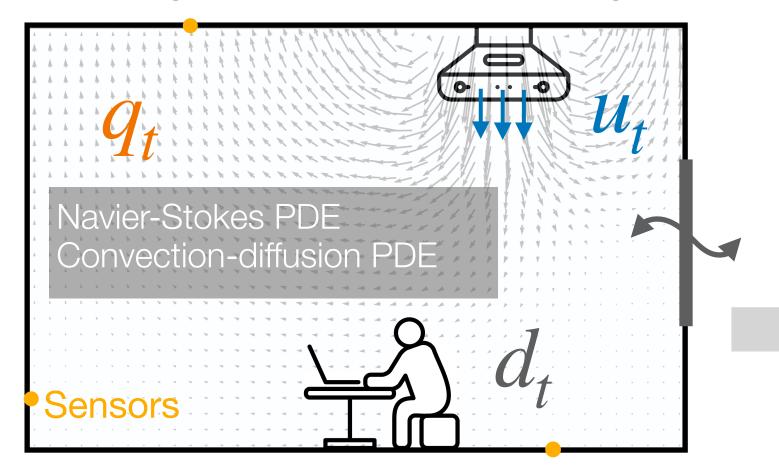
Building PDE Model Knowledge



System State: q_t : $[\vec{v}(z,t), C(z,t), T_e(z,t)]$

Airflow velocity, CO₂, Temperature

Airflow rate: $u_{1,t}$, Air temperature $u_{2,t}$

Disturbance d_t Model parameters: Θ

Learning system

min $\sum_{t=0}^{T}$ measurement difference $\hat{q}_{t+1} \leftarrow \mathbf{PDEModel} \ (\Theta, u_t, q_t, d_t)$ s.t. $C(z_{sensor}, t), T_e(z_{sensor}, t)$ is measured

Control

min $EnergyCost(u_{0:T})$ $u_0, u_1, ..., u_T$ s.t. $\hat{q}_{t+1} \leftarrow PDEModel(\Theta, u_t, q_t, d_t)$ Constraints on air quality
Constraints on temperature
Constraints on control variables

PDE Airflow dynamics

Energy Saving

Thermal Comfort

Healthy Environment