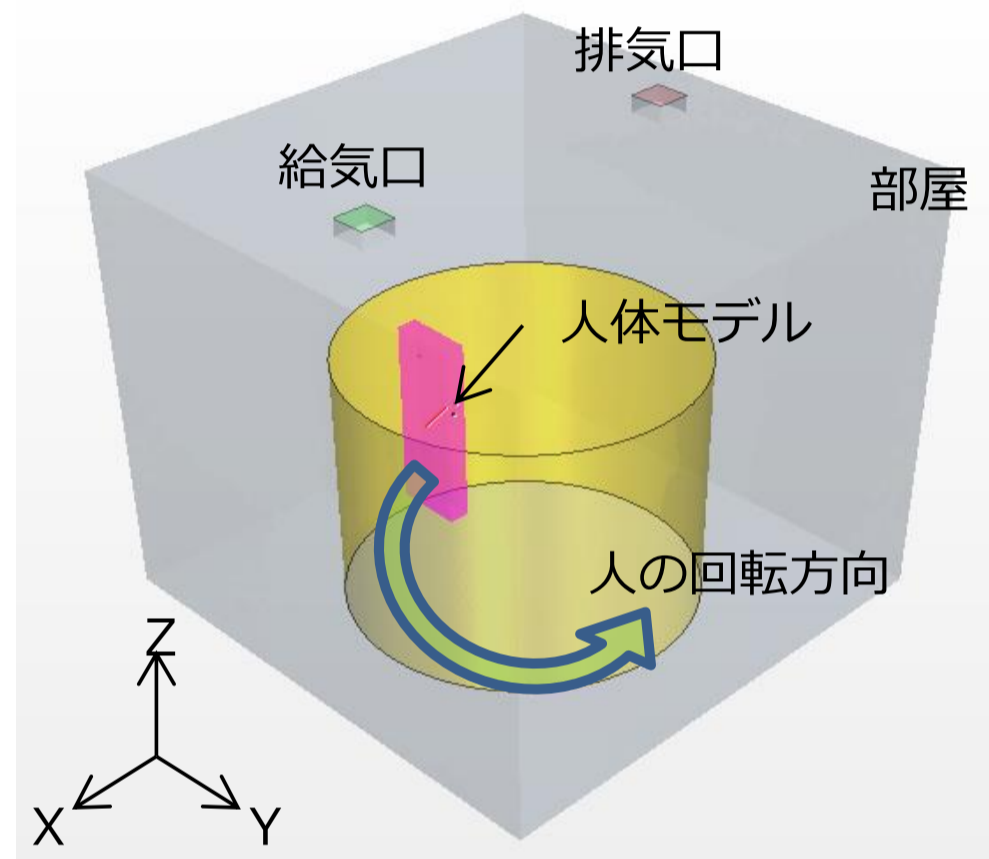


# CFD analysis on the influence of indoor air current by human movement

Results of CFD analysis on the influence of indoor airflow caused by rotational motion of the human body in one room

Research objective: Consider how the contaminants in indoor air move due to the rotational motion of a person.

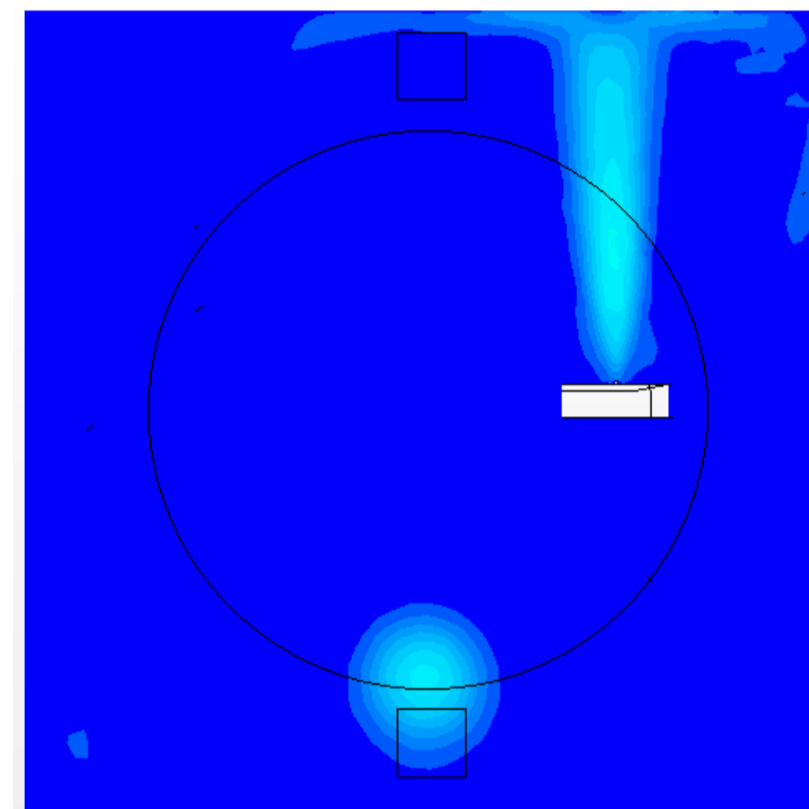


Analysis model

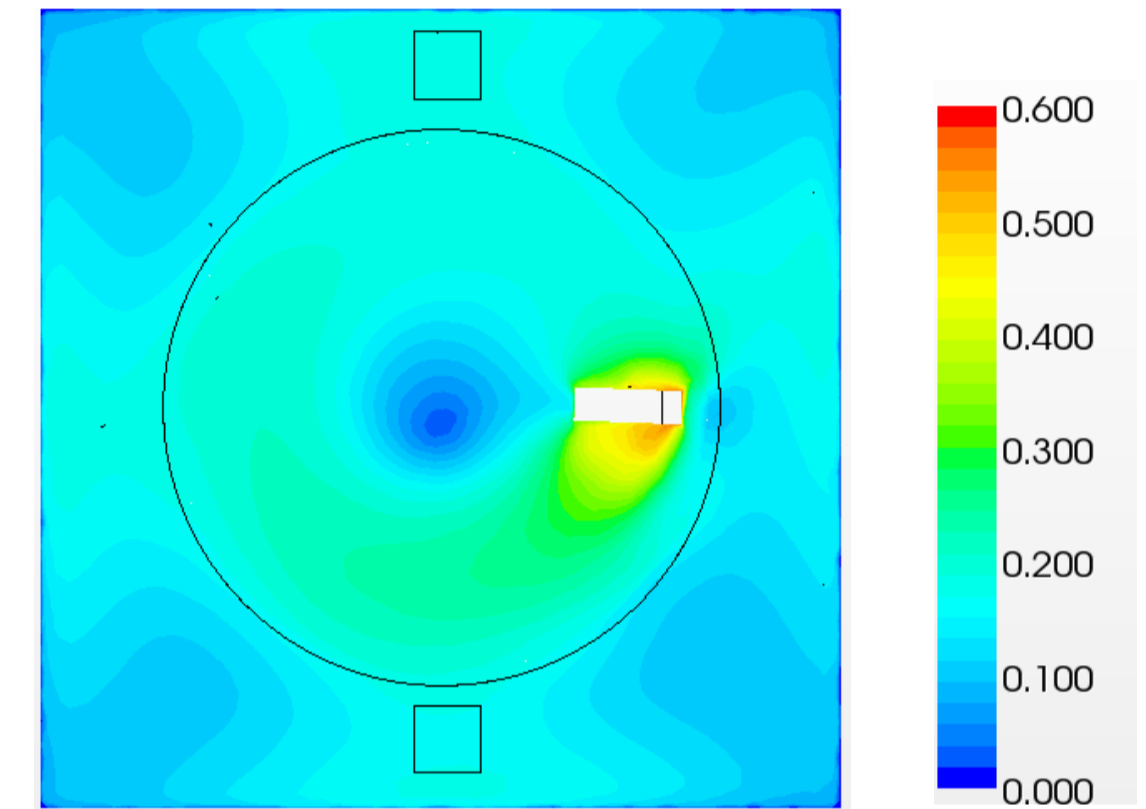
Conclusion:  
At the present stage, the speed and pressure influence of the indoor air current caused by the cyclical rotational motion of a person was elucidated. The reason for influencing the indoor air current caused by the movement of a person is considered to be the drag generated by exercise.

This research clarified the magnitude of the generated drag caused by the periodic rotational motion and the work due to movement due to drag.

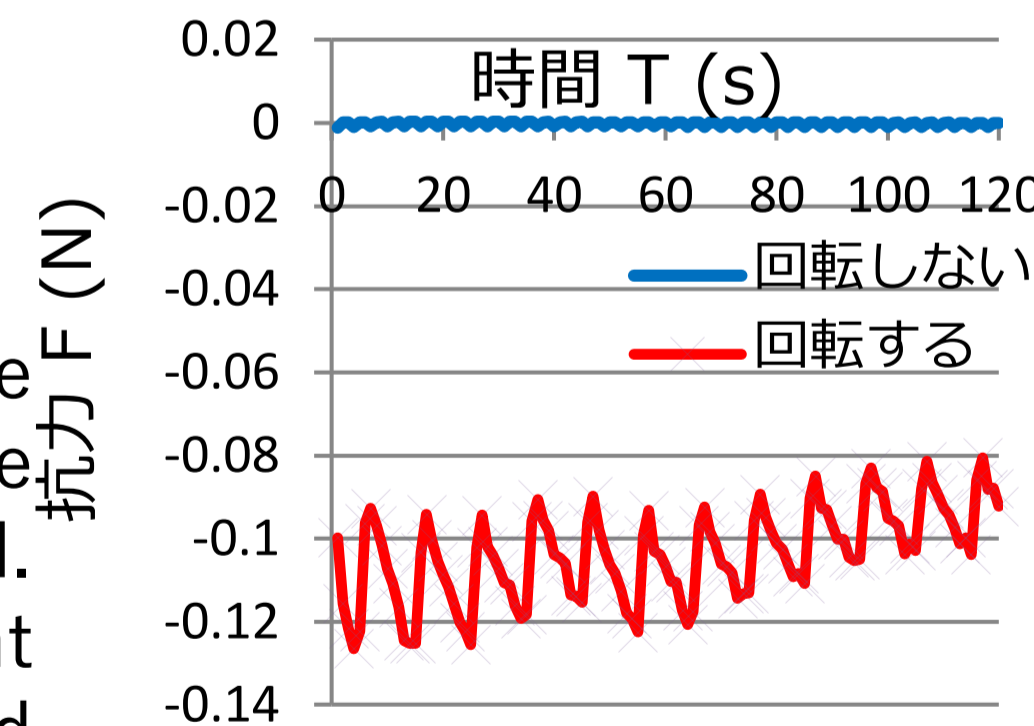
person does not rotate



person rotates



Distribution of speed magnitude After 2 minutes on the XY plane



Drag curve

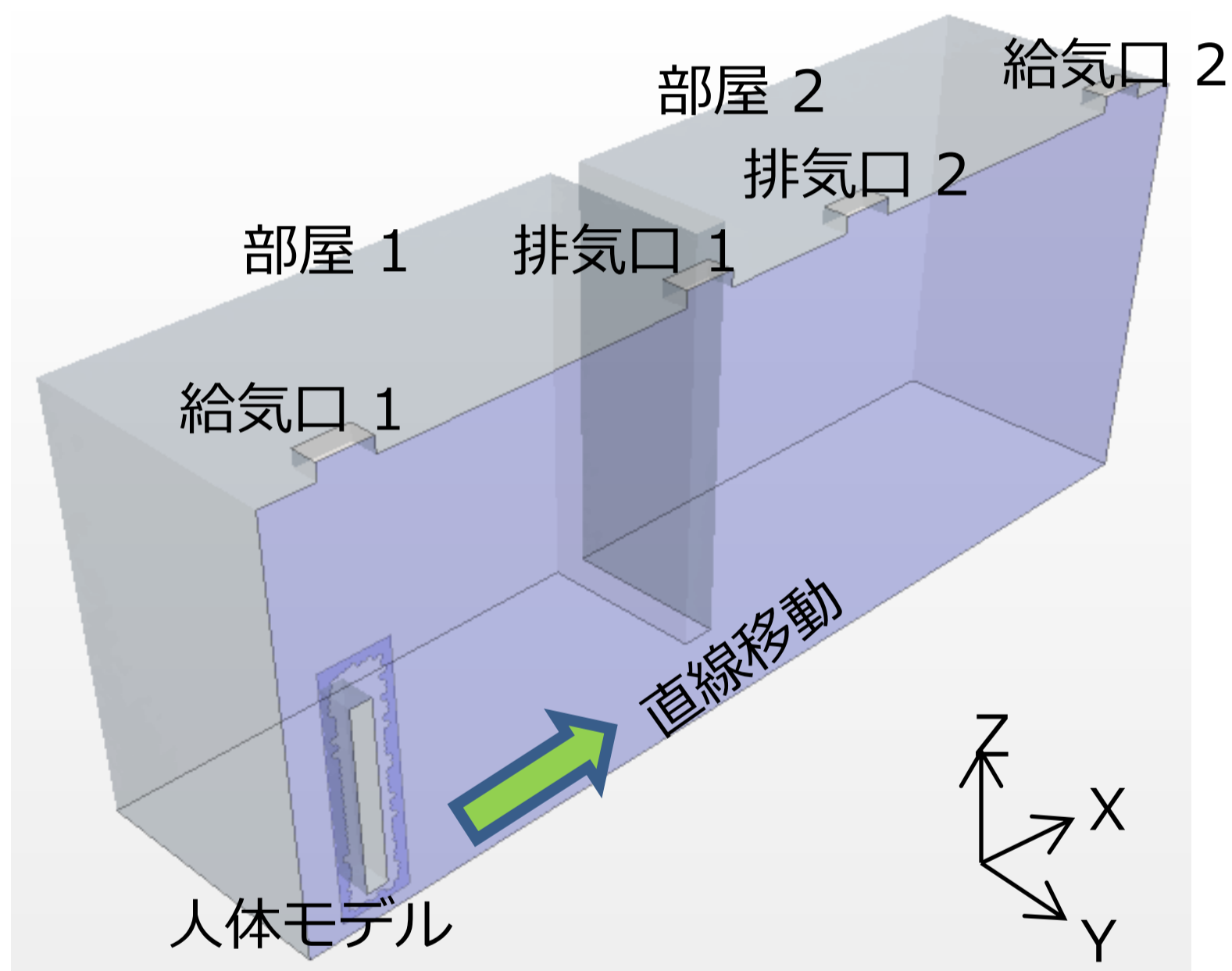
During the rotation period of 10 seconds, work due to people moving due to drag

場合 項目	人の回転運動 による仕事	一人当たり必要換 気量による仕事
計算式	$W1 = F \times V \times T$	$W2 = \Delta p \times Q \times T$
条件	$F = 0.1 \text{ N (平均)}$ $V = 0.44 \text{ m/s}$ $T = 10 \text{ s}$	$\Delta p = 0.01 \text{ Pa}$ $Q = 30 \text{ m}^3/\text{h}$ $T = 10 \text{ s}$
結果	0.44 J	$8.3 \times 10^{-4} \text{ J}$

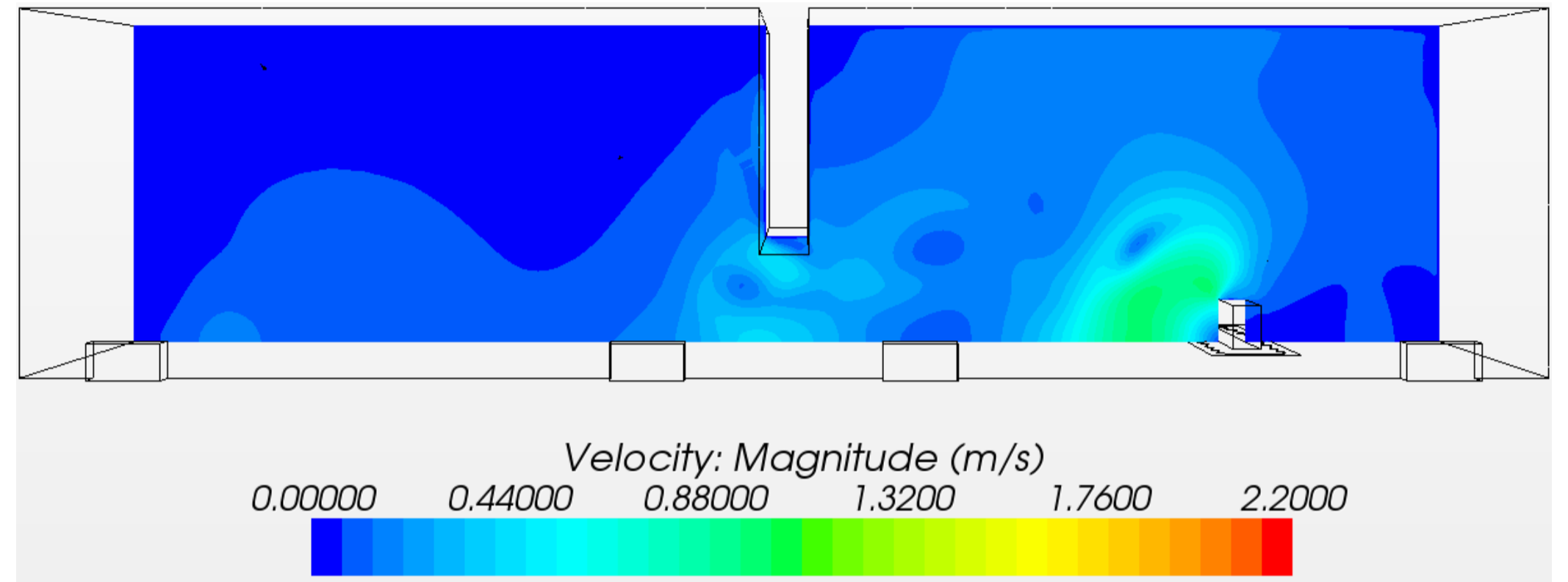
# CFD analysis on the influence of indoor air current by human movement

Result of CFD analysis on the influence of indoor air current by linear movement of human body between two rooms

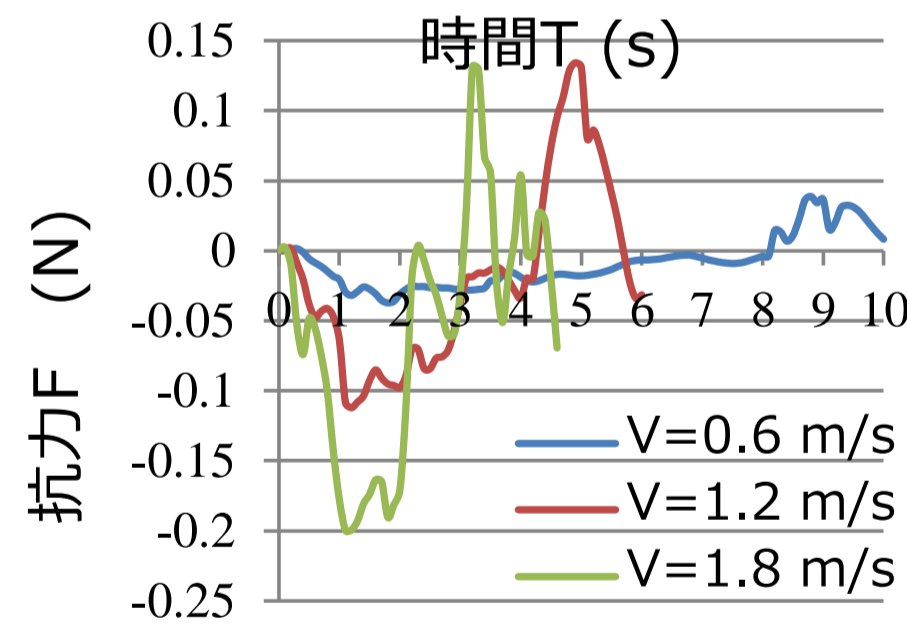
Research objective: Consider how moving contaminants in indoor air will move by linear movement of people.



Analysis model



When the linear velocity is 1.2 m / s, the velocity magnitude distribution map after moving once in the XY plane



Drag curve

While moving from room 1 to room 2 once, Work by people moving due to drag

項目	直線移動による仕事	必要換気量による仕事
計算式	$W1 = \int F(t) \cdot V \cdot dt$	$W2 = \Delta p \times Q \times T$
結果	0.07 J (V=0.6) 0.24 J (V=1.2) 0.45 J (V=1.8)	(T=5 s) $4.1 \times 10^{-4}$ J

Conclusion:

At the present stage, the speed and pressure influence of the indoor air current caused by the cyclical rotational motion of a person was elucidated.

The reason for influencing the indoor air current caused by the movement of a person is considered to be the drag generated by exercise.