

# Direct Model Comparison

# PDV Flight Simulation – Approaching Strategy

- New model:

GPS + UWB approaching (with random offset)



Different PDV approach strategies

- Original model:

Directly update position

# PDV Flight Simulation – PDV altitude change

- New model:

PDV ascent + descent only ***once*** (take off from BS and RTH)

- Original model:

PDV ascent + descent at BS and ***each*** node

# PDV Flight Simulation – RTH criteria

- New model:

$$\text{rth\_energy\_gps} + \text{rth\_energy\_uwb} + \text{next\_energy\_gps} + \text{next\_energy\_uwb} + \text{ipt\_energy} + 10\% \text{ max\_pdv\_energy} > \text{pdv\_remain\_energy}$$

- Original model:

$$\text{rth\_energy} + \text{next\_energy} > \text{pdv\_remain\_energy}$$

# WSN energy cost update

- New model:

Update energy consumption of all SNs when all PDVs finished.

- Original model:

Periodically update WSN energy consumption for each iteration

PS: In the new model, the simulation should only run once with multiple PDVs. But in the original model, iterated single PDV task will be performed until no enough SNs to be recharged.

# Fitness function difference

- New model:

Consider 3 factors: PDV flight distance, total recharged energy and PDV energy cost (with normalization and activation function  $\sinh(x)$  )

- Original model:

Consider 2 factors: PDV flight distance and total recharged energy (no additional process)