Geometric Temporal Contrastive Learning in Multi-Agent RL
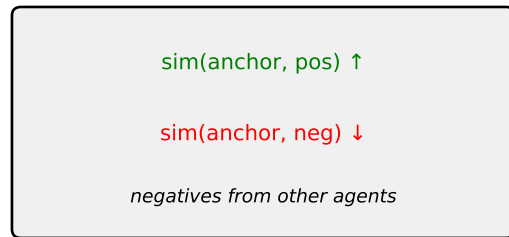

Multi-Agent Trajectories

Agent 1
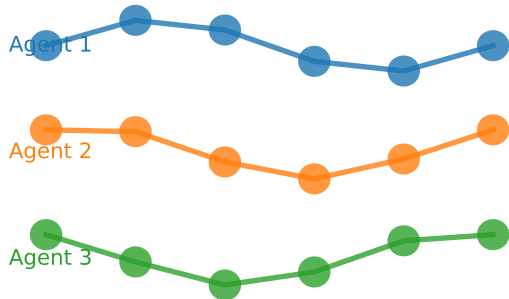
Agent 2

Agent 3

Geometric Temporal Positive Sampling

$P(\Delta t) \sim Geo(1-\gamma)$

Anchor

Positive

InfoNCE Loss

sim(anchor, pos) ↑

sim(anchor, neg) ↓
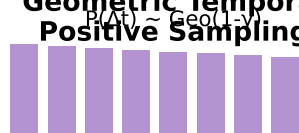
negatives from other agents

Key insight: Multi-agent trajectories provide natural negative samples, enabling contrastive learning without augmentation