

Weight = Distance cost + Turn penalty + Collision risk cost + One-way aisle violation penalty + Docking station bias

$$w(i,j) = \alpha D_{ij} + \beta T_{ij} + \gamma C_{ij} + \delta U_{ij} + \epsilon R_j$$

α = 1.0 (distance)

β = 2.0 (turns)

γ = 3.0 (collision)

δ = 1000 (one-way violation)

ϵ = 0.5 (dock attraction)

#####Code#####

```
def edge_cost(i, j, prev, traffic_map, docks, params):
    alpha, beta, gamma, delta, epsilon = params

    # 1. Distance (Manhattan)
    D = abs(i.x - j.x) + abs(i.y - j.y)

    # 2. Turn penalty
    if prev is None:
        T = 0
    else:
        T = turn_cost(prev, i, j) # 0, 1, or 2

    # 3. Collision / congestion
    C = traffic_map.get((i, j), 0)

    # 4. One-way aisle violation
    U = 0 if is_legal_direction(i, j) else 1

    # 5. Dock attraction
    R = min(abs(j.x - d.x) + abs(j.y - d.y) for d in docks)

    return (
        alpha * D +
        beta * T +
        gamma * C +
        delta * U +
        epsilon * R
    )
```