Bevorzugter Zitierstil für diesen Vortrag

Axhausen, K.W. (2010) Scheduling models in MatSim, presentation at the *iTEAM Seminar*, Washington, D.C., January 2011.

Scheduling models in MatSim

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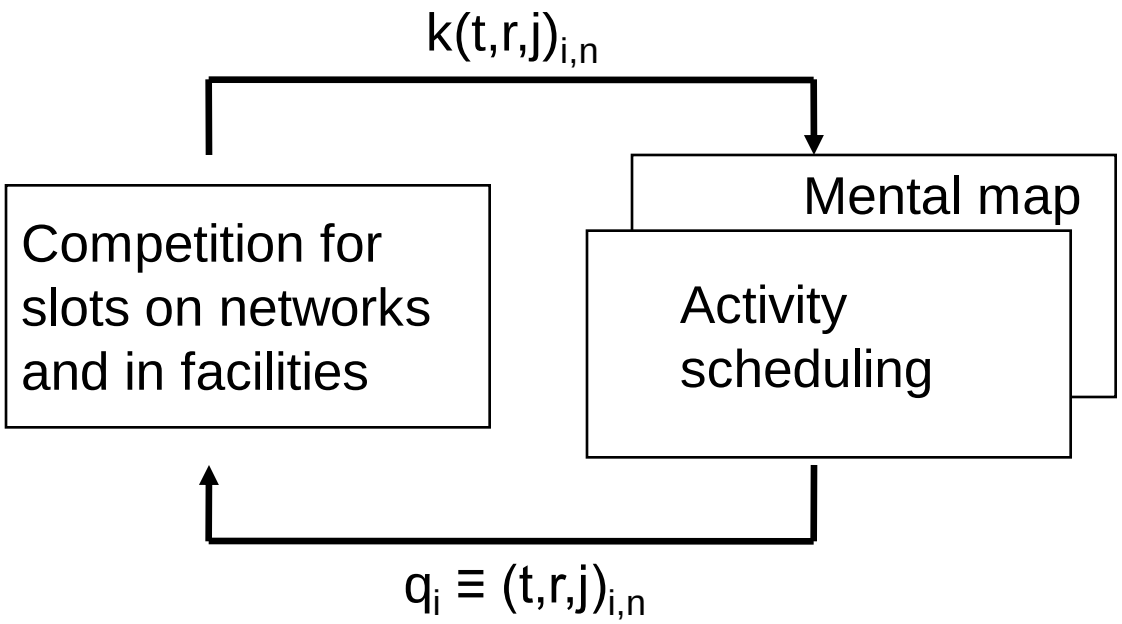
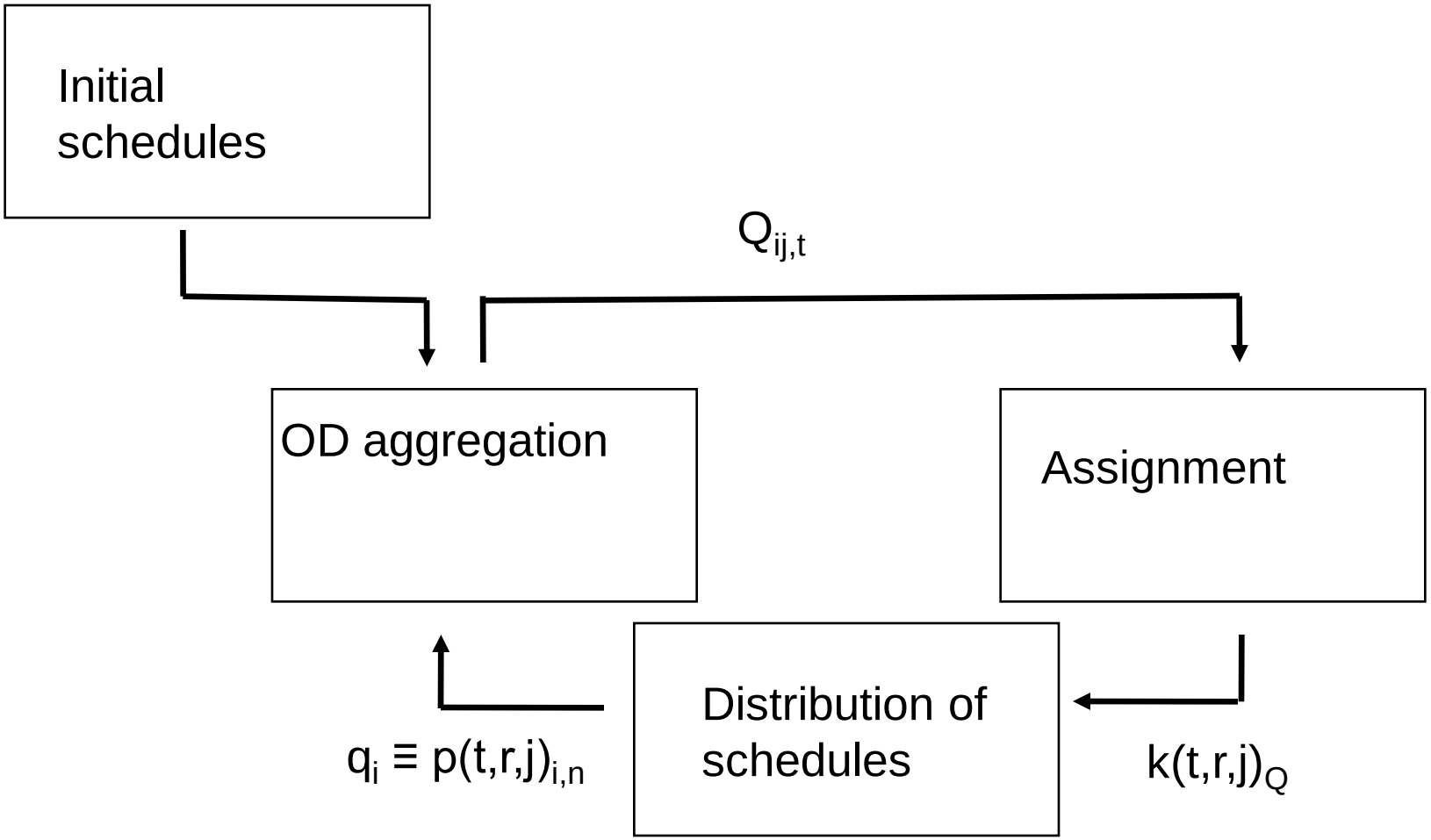
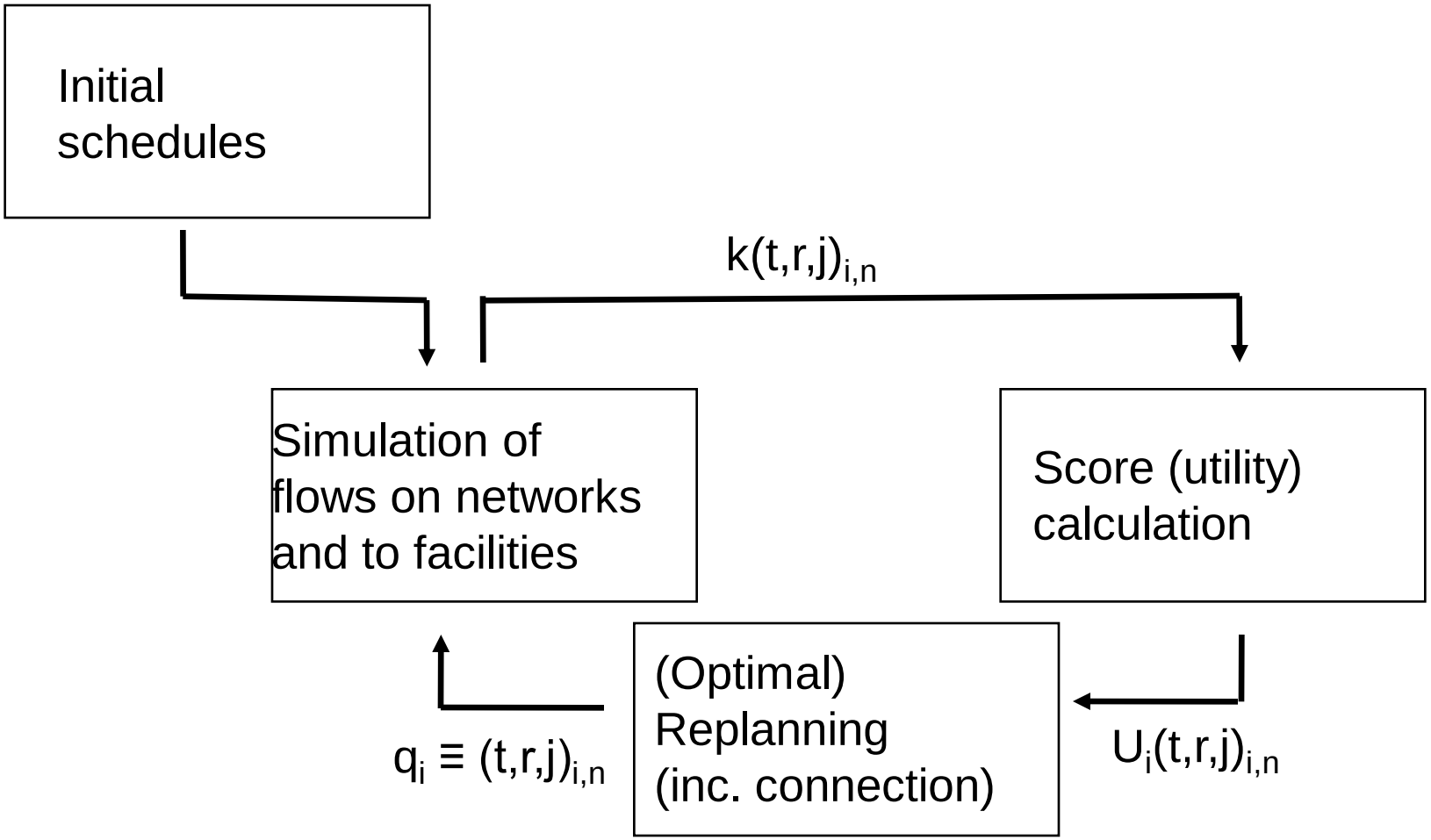
Learning approach of the generic one-day transport model



Equilibrium search in ABM & assignment combinations



Equilibrium search in MATSim



Current Vickrey-type utility function

$$U_{plan/driver} = \sum_{i1}^{n} U_{plan/driver,i1} + \sum_{i2}^{n} U_{plan/driver,i2}$$

$$U_{act,i} = U_{driv,i} + U_{idea,i}$$

Activity scheduling with Vickrey-style utility function

- Number and type of activities
- Sequence of activities
  - Start and duration of activity
  - Composition of the group undertaking the activity
  - Expenditure division
  - Location of the activity
    - Movement between sequential locations
      - Location of access and egress from the mean of transport
        - Parking type
      - Vehicle/means of transport
      - Route/service
      - Group travelling together
      - Expenditure division

Number and sequence of activities

MATSIM

- Conditional random draw from observed chains

Alternatives:

- Bowman-style NL logit models
- Albatross – style rule based models

Start and duration of activities

MATSIM

- Random mutation (minutes)
- planomat – GA based optimisation (minutes)

Alternatives:

- (Bowman-style NL logit models) for rough time-periods
- Albatross – style rule based models

Location of activities

MATSIM

- Workplace/School: Conditional random allocation
- Other: Time-spaced constrained random allocation
- Other: Time-space and capacity constrained RUM/ML model

Alternatives:

- (Bowman-style NL logit models)
- Albatross – style rule based models

Choice of main mode

MATSIM

- Initial plan: MNL
- Updates: planomat – GA-based optimisation

Alternatives:

- (Bowman-style NL logit models)
- Albatross-style mode choice

Choice of access mode/point

MATSIM

- Public transport: Next stop and walking
- Parking: Part of shortest path with BPR-based capacitiy functions for the parking links

Alternatives:

- Generally ignored

Shortest path between locations

MATSIM

- A* - Dijkstra

Alternatives:

- Out-of-scope

Activity schedule with Joh-style utility function

- **Number and type of activities**
- **Sequence of activities**
  - Start and duration of activity
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  - Location of the activity
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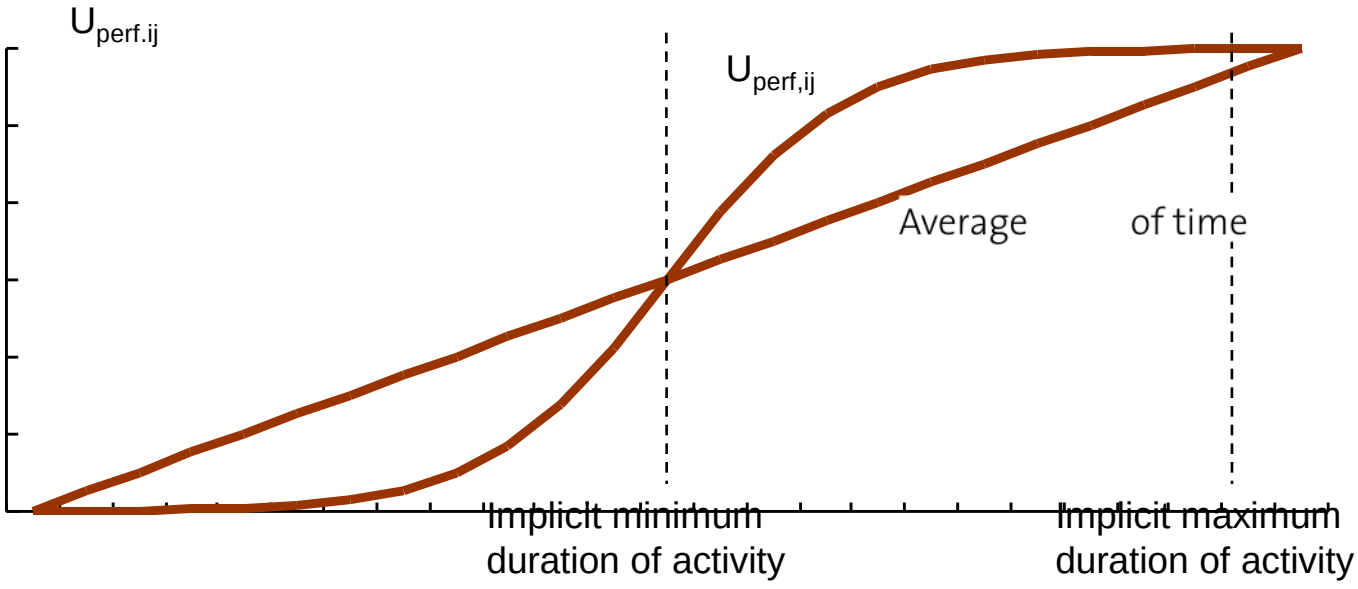
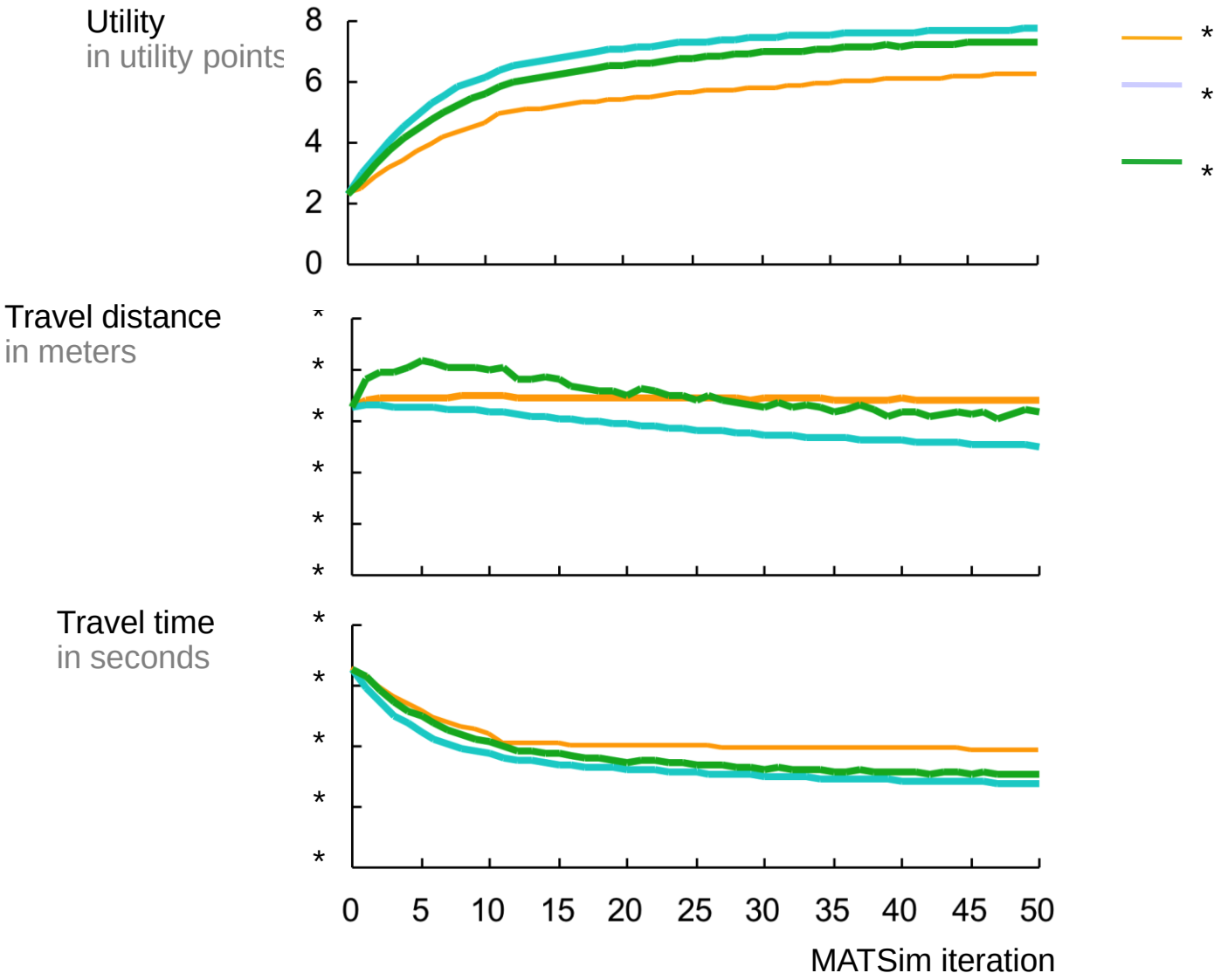
Joh's 2004 utility function for activities

$$U_{perf,ij}(t_{perf,ij}) = U_{ij}^{min} + \frac{U_{ij}^{max} - U_{ij}^{min}}{(1 + \gamma_{ij} \cdot exp\left[\beta_{ij}(\alpha_{ij} - t_{perf,ij})\right])^{1/\gamma_{ij}}}$$

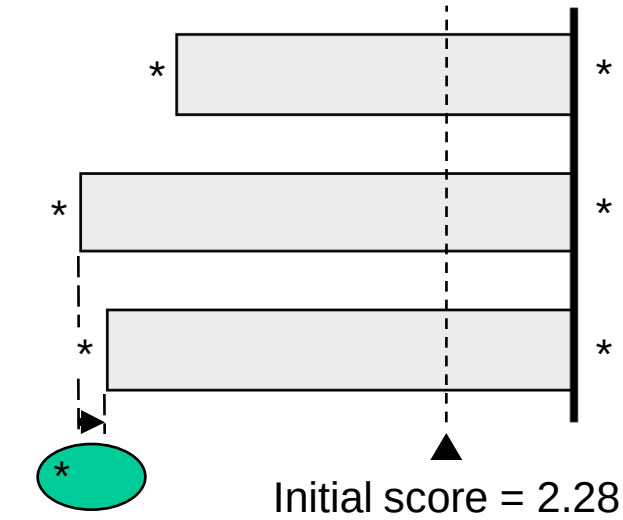


Planomat-X with schedule recycling



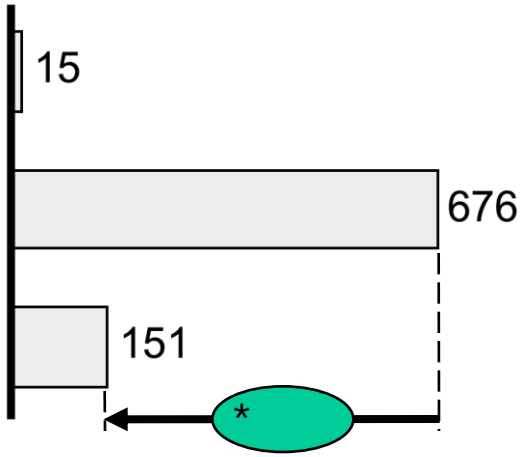
Planomat-X with schedule recycling

Final average utility score of executed schedules (in utility points)



Initial score = 2.28

Replanning runtime* per agent (in msec)



Activity scheduling with some best response modules

- **Number and type of activities**
- **Sequence of activities**
  - **Start and duration of activity**
  - Composition of the group undertaking the activity
  - Expenditure division
  - **Location of the activity**
    - Movement between sequential locations
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        - Parking type and location
      - **Vehicle/means of transport**
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Source of variation in MATSim tomorrow

- Home location
- Work location

- Congestion feedback from facilities and network

- Quality of location
- Social network membership

- Agent-specific taste parameters (via socio-demographics)
- (Agent-specific choice sets)

Activity scheduling with some best response modules

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