Calibrating MFD models from Mobile Phone Data

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Trip Length Analysis

- Estimate dynamic trip lengths for a typical day between different OD pairs.

$$\bar{L} = \int_t^{t+\Delta T} L(n(s)) \, \mathrm{d}s.$$

- Estimate path flow coefficient evolution with time for different OD pairs.

$$\alpha_i(t) = \frac{n_i(t)}{\sum_i n_i(t)}.$$

- Trip length distribution within a reservoir. Compute the coefficient of variability.

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UE and BRUE gaps

- Gap in User Equilibrium (UE).

$$\mathsf{Gap}_{UE}^{od}(t) = \frac{\sum_i \alpha_i \left(t_i - t^*\right)}{\sum_i \alpha_i}$$

- Gap in Bounded Rational User Equilibrium (BRUE).

$$\mathsf{Gap}_{BRUE}^{od}(t) = \frac{\sum_i \alpha_i \, \max((t_i - (1 + \epsilon)t^*), 0)}{\sum_i \alpha_i}$$

- t^* is the shortest macropath trip that starts at time t.

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