Extracting the Mobility of Transit System based on GPS data

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GPS data

• 543 vehicles (MBTA)

• Latlon recorded about every 20 seconds in a day

• About 760,000 records in total
Flight length distribution

- Pause based model
- Max: 38.43 km, Min: 0.0006 km
- Range: 10m ~ 3.5km

Figure 1. Complementary cumulative density function of flight lengths (log-log)
Figure 2. Probability density function of flight lengths
Flight length distribution III

Figure 3. Probability density function of flight lengths. Various known distributions are fitted using MLE.

Exponential: $\mu = 0.345$

LogNormal: $\mu = -1.43$, $\sigma = 0.95$
Figure 4. Probability density function of pause time
Velocity distribution

Figure 5. Probability density function of velocity (km/hour).
Figure 6. velocity (km/hour) v.s flight length
Location stopped
Location stopped (frequency > 10)
Trajectory