

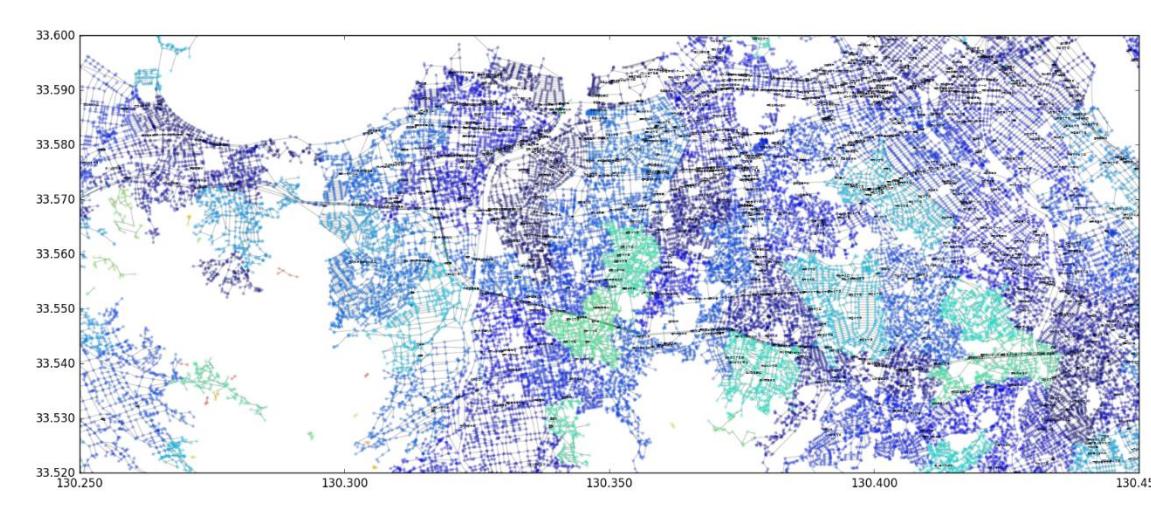
- より革新的で持続可能な共進化社会システムを構築するために、伝統ゆたかで斬新な応用数学と純粋数学の知見を積極的に取り入れたマス・フォア・インダストリ研究の手法が有効
- それらを活用した各分野との融合研究を推進し、汎用的・課題分野に適合する数学ソフトウェアの構築を目指す

● 都市OSと産業数学ユニット

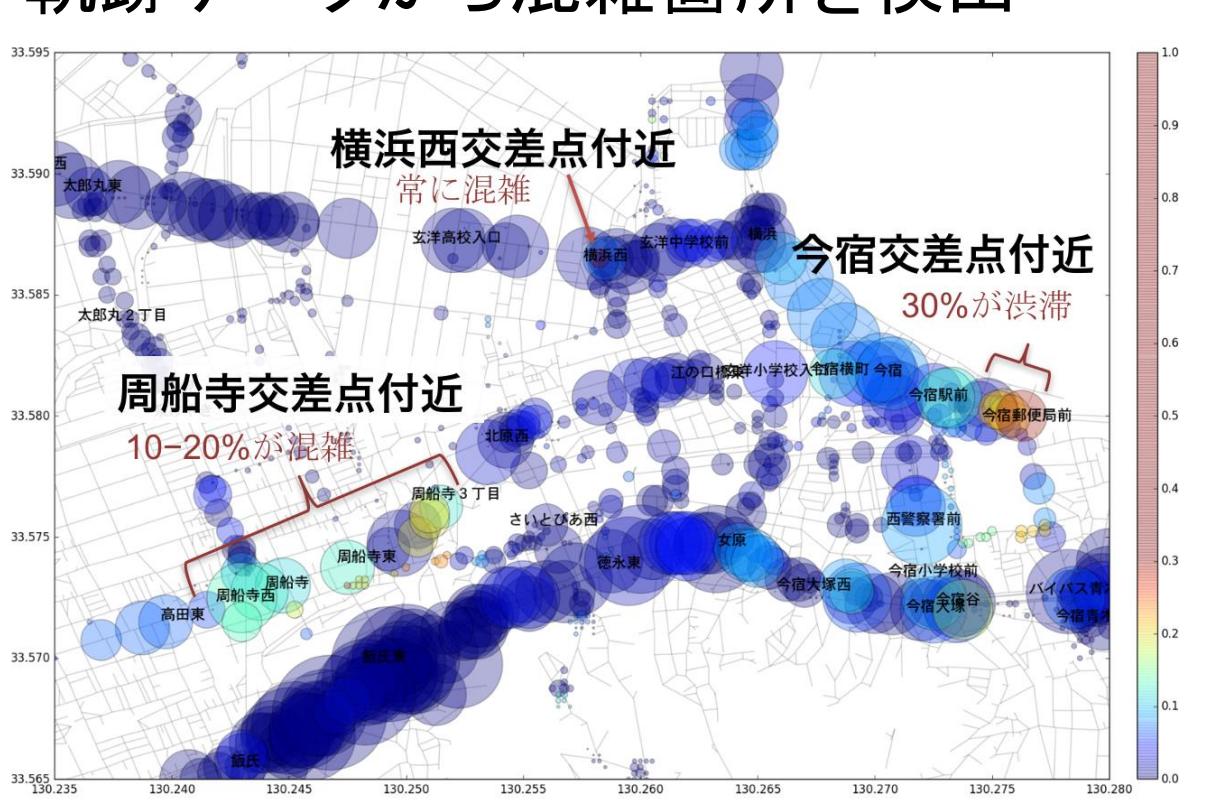
都市・交通の最適化

■ 交通流の可視化・表現、渋滞・混雑予測、最適な施設配置などの都市計画

地域間での関連性を解析



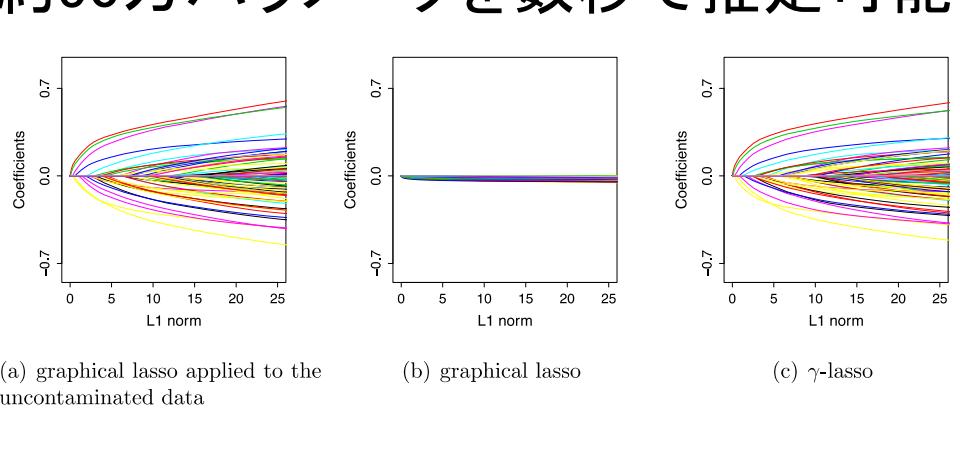
軌跡データから混雑箇所を検出



エネルギーの最適化

■ 複雑かつノイズを含む様々な履歴や要因から電力使用量を予測

約50万パラメータを数秒で推定可能



市民サービスの最適化

■ 即時性の高い避難計画、堅牢なセキュリティ

CCESS 普遍的最速流を用いたリアルタイム避難計画の策定

ある地点(点は避難所、枝は道路)の使用率を色で可視化し、避難における道路ネットワーク上のボトルネックを確認

避難者の50%が避難完了

Theta = 124 of 120

空港線・天神駅改札周辺

七隈線・天神南駅改札

混雑

天神地下街ネットワーク (152点, 3010枝)

特に混雑

避難未完了者が多い

避難時間: 361秒

避難完了人数: 1,334人

LOF (Push-relabel) v/ Time Limit (200,460)

津波到達時間 200秒後

差の解消

Cumulative Flow

Time 0

2500

2000

1500

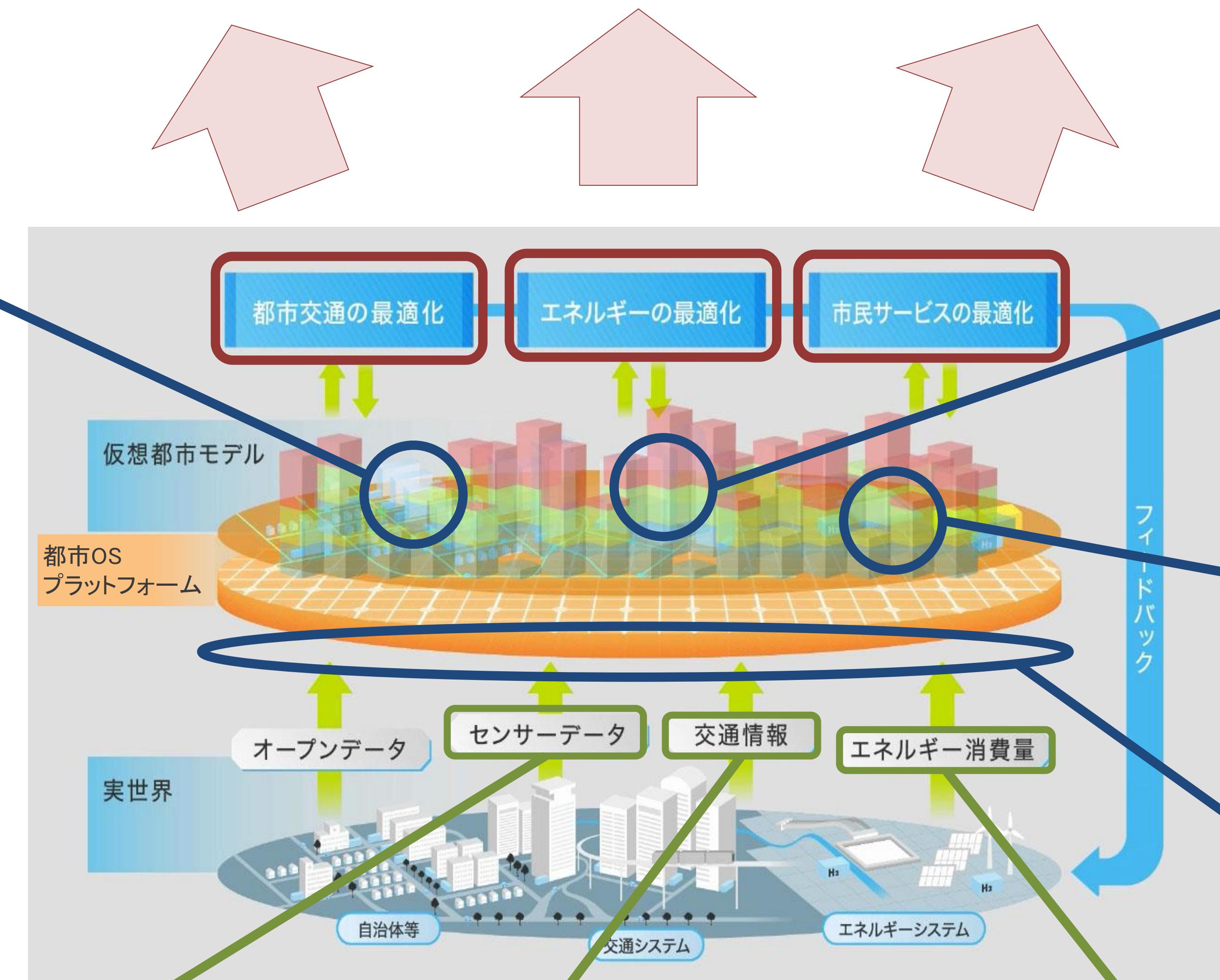
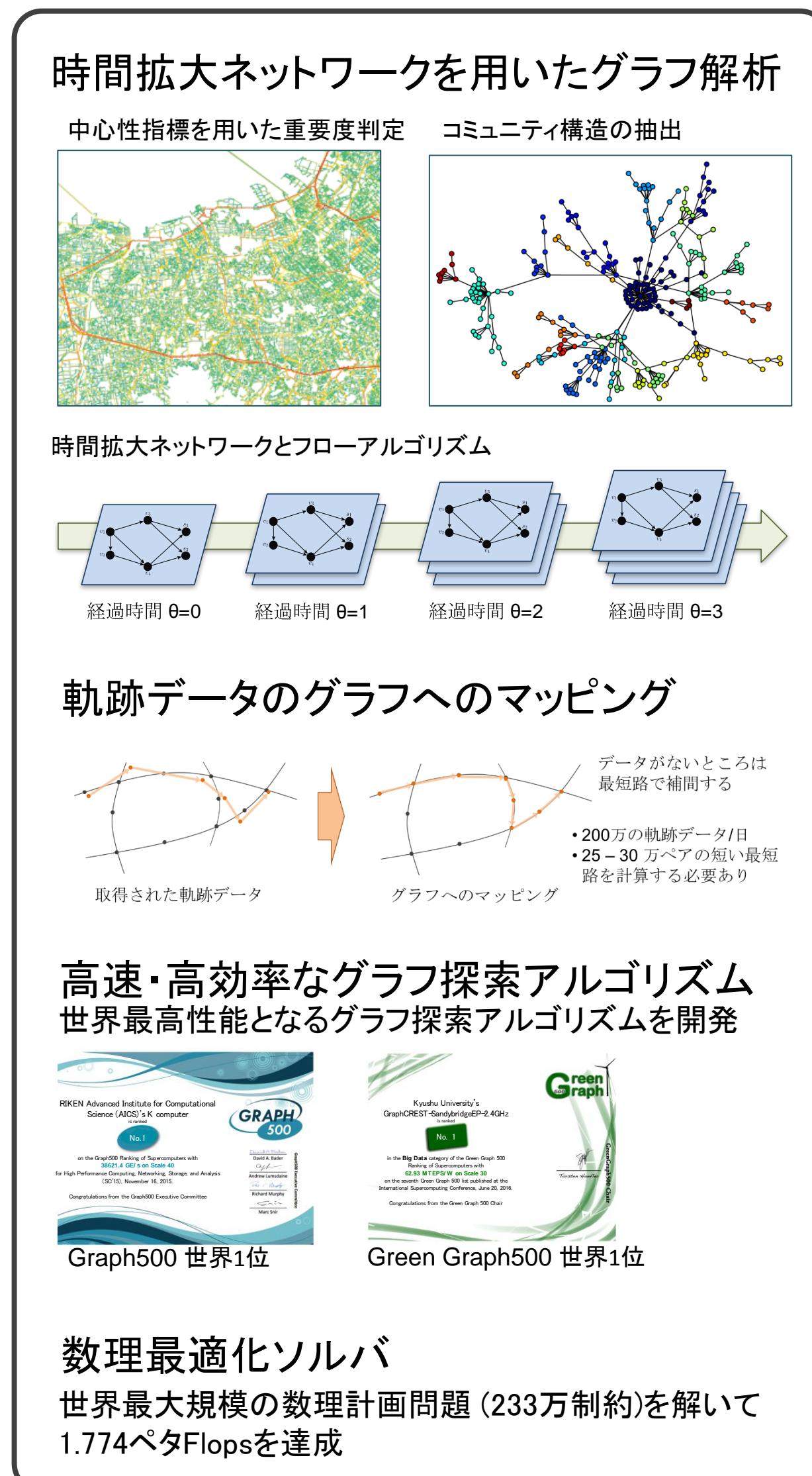
1000

500

0

0 50 100 150 200 250 300 350 400

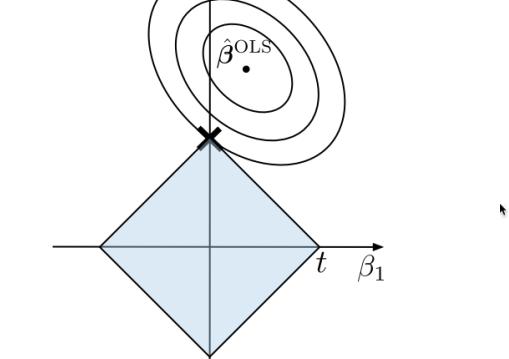
グラフ解析・数理最適化



スペース推定

高次元データに対する時系列モデリング

L1正則化



グラフィカルモデリング

- 変数の関係性をグラフとして可視化し、高次元データの変数間の因果関係を明らかに
- 外れ値に影響を受けにくく、計算時間がかかる高効率な手法を用いる

ビッグデータ可視化

ハリケーンデータ解析

複雑かつノイズを含むビッグデータ ⇒ 本質が明瞭につかめる形に可視化

Volume data for the Hurricane Isabel

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