

# **2017 PCOG Team Meeting**

**Boonyarit Changaival**  
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## Topics

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- Chaotic Traversal
- Car Fleet Allocation

# Chaotic Traversal (CHAT)

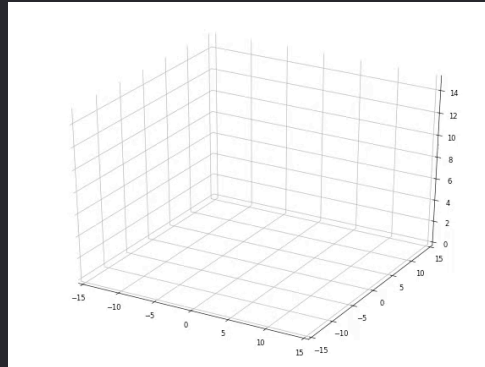


A graph traversal algorithm with a chaotic dynamics...



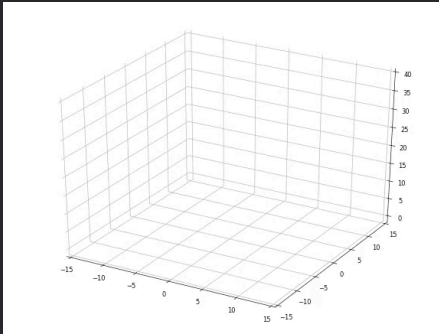
# Chaotic Dynamics

- Simulate the natural phenomenon
- Defined by the mathematical equation(s)
- Deterministic

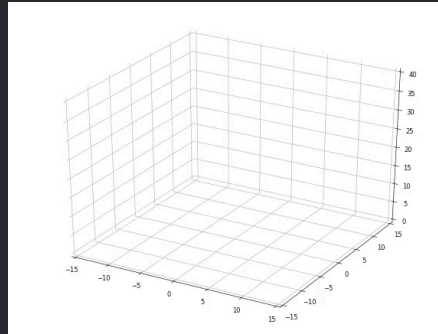


# Chaotic Dynamics

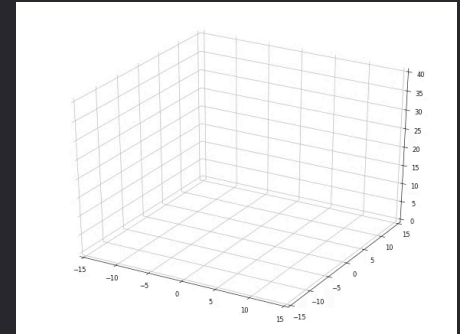
- Sensitive to parameters – different behaviors
- Tuning for certain use cases



$\alpha = 0.33$

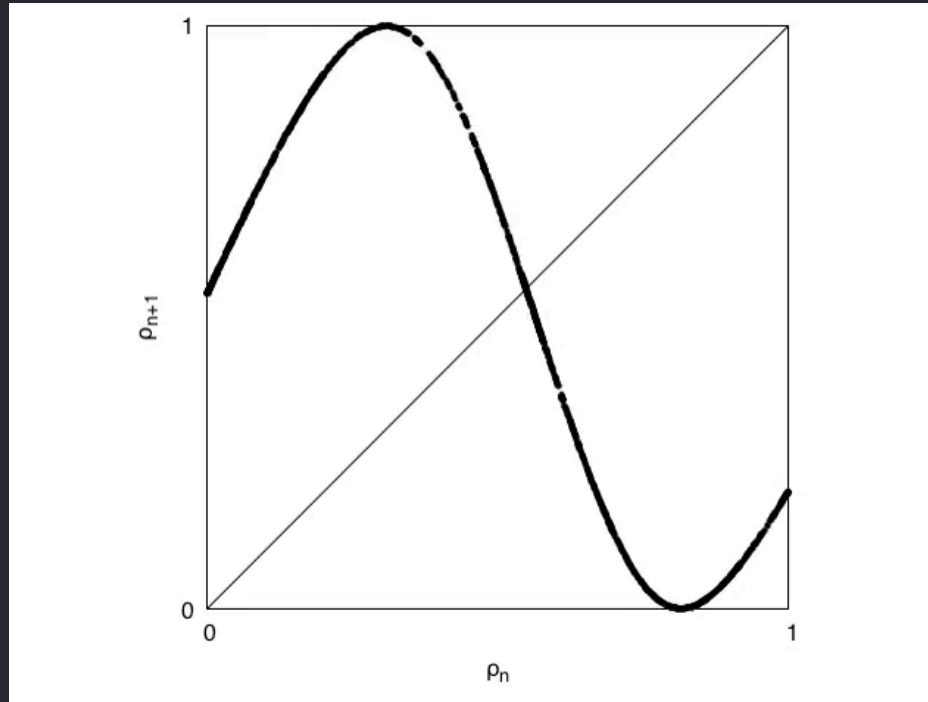


$\alpha = 0$



$\alpha = 1.13$

## Transition between states



## CHAotic Traversal (CHAT)

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### Purposes

Enables an efficient large graph exploration under a tight restriction on memory usage.

### Methodology

Integrates chaotic dynamics (Rossler dynamics and Lozi map).  
Tested on 1M nodes graphs.

### Result

CHAT performance on all topologies is significantly better than a traditional Random Walk.

# Car Fleet Allocation



In collaboration with ExaMotive S.A.

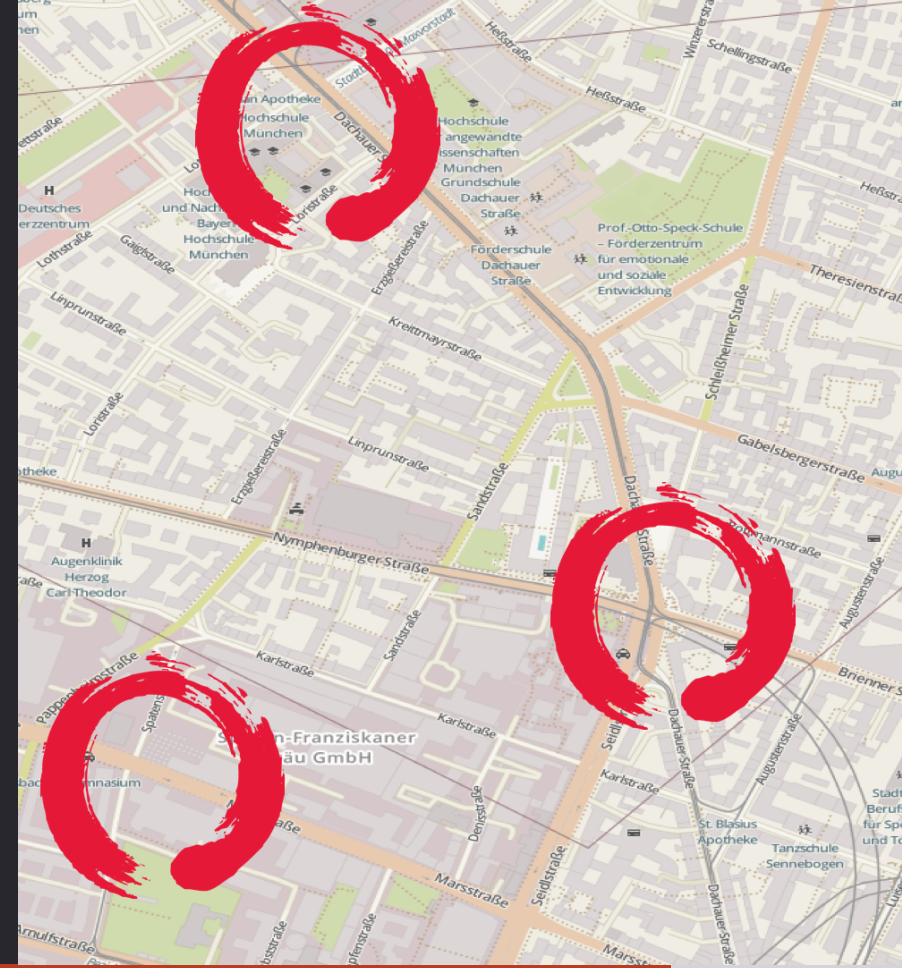




# Fleet Allocation

↑ Increase Coverage

↓ Fleet size



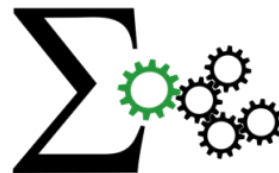
 **EXAMOTIVE**



**Expert View**



**Real Map + Statistic**



**Models + Algorithms**





# Raster Map

# Street-Level Map

## Current Graph Model

- 📍 People in buildings
- 📍 Street node as a center of a station



## Result Example



# Thank you for your attention!



Conclusion - I work on two topics, Graph Traversal and Optimization.

