# 國立中山大學應用數學系
# 學術演講

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講　題：Uniform Placement of Alters on Spherical Surface (U-PASS) for Visualizing Networks

時　間：2026/10/29（Thursday）14:10 ~ 15:00

地　點：理 SC4009-1 教室

茶　會：13:30


**Abstract**

Ego-centric networks consist of a focal node (ego) and its directly connected nodes (alters), serving as an important tool to study the network structure. Effective visualization of such networks is essential for revealing relational patterns among alters. This study introduces U-PASS (Uniform Placement of Alters on Spherical Surface), a novel spherical layout algorithm that achieves uniform node distribution through a particle swarm optimization (PSO) framework. Unlike conventional methods that merely maximize Euclidean distances, U-PASS incorporates network topology, prevents cluster overlaps, and integrates node attributes through a three-stage optimization procedure. Theoretical analysis establishes a connection between U-PASS and minimum-energy designs on a two-dimensional plane, ensuring layout uniformity. A new discrepancy-based criterion is proposed to evaluate layout quality. Simulation studies and real-world examples demonstrate that U-PASS consistently outperforms existing visualization approaches. Furthermore, we extend U-PASS to handle generalized network structures, enabling its application beyond ego-centric settings to broader network visualization tasks.


敬 請 公 告！ 歡 迎 參 加！

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