



DEPARTAMENTO DE  
ANÁLISIS MATEMÁTICO Y  
MATEMÁTICA APLICADA



# SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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## **Flow Oriented Perturbation Theory**

In the context of Quantum Field Theories, the computation of generic Feynman integrals is crucial for connecting with phenomenology at particle colliders. Usually, these integrals are studied in the momentum-space picture. However, recent developments show that the dual picture in coordinate-space (remember Heisenberg's uncertainty principle) may offer very interesting properties.

Flow oriented perturbation theory (FOPT) is a coordinate-space analogue of time-ordered perturbation theory. Within this approach, a generic Feynman graph is mapped to a sum of all its possible different energy-flows respecting energy conservation at each vertex (strongly connected directed graphs). This representation shows an interesting interplay between S-matrix elements (which are the relevant quantities for physical scattering processes) and Fourier transforms of polytopes.

Based on: <https://arxiv.org/abs/2210.05532>

**Organized by: Departamento de Análisis Matemático y Matemática Aplicada and Instituto de Matemática Interdisciplinar (IMI)**

**Date: Thursday, July 4, 2024, 13:00h**  
**Place: Seminario Alberto Dou (Room 209)**  
**Facultad de CC. Matemáticas, UCM**