

## Optimization and Equilibrium Seminar

**Speaker:** David Villacís (Universidad de Loyola, España)

**Title:** Bilevel Hyperparameter Learning for Nonsmooth Regularized Imaging and ML Models.

### Abstract:

We study a bilevel optimization framework for hyperparameter learning in variational models, focusing on sparse regression and classification. Specifically, we use a weighted elastic-net regularizer, where feature-wise penalties are learned through a bilevel formulation. Our main contribution is a Forward–Backward (FB) reformulation of the nonsmooth lower-level problem that preserves its minimizers. This yields a bilevel objective composed with a locally Lipschitz solution map, enabling the use of generalized subdifferential calculus and efficient subgradient-based methods. Experiments on synthetic data show that our approach significantly improves prediction accuracy and support recovery compared to scalar regularization, demonstrating the benefits of feature-wise tuning and bilevel learning.

Miércoles 06 de agosto a las 16:45 hrs

Sala de Seminarios John Von Neumann del Centro de Modelamiento Matemático (Beauchef 851, Edificio Norte, Piso 7).

