## Safwen Markou (Monastir and Carthage)

## Data Assimilation for Advection-Diffusion Model using Extended Kalman Filter

**Abstract.** We apply the Extended Kalman Filter (EKF) to estimate the state of a nonlinear advectiondiffusion system from noisy observations. Using a semi-implicit finite difference scheme, we simulate and assimilate data to recover the underlying state. Results show that the EKF rapidly converges to the true solution, with improved accuracy over successive iterations, despite persistent high-frequency noise in regions of steep gradients.