SEMINARIO
"PROFESOR FÉLIX MONDÉJAR"
DPTO. DE MATEMÁTICA APLICADA Y ESTADÍSTICA

CONFERENCIA

"Stability of Asymmetric Steady States in a Delayed Patchy Model"

PONENTE: **BAPAN GHOSH**

Indian Institute of Technology Indore

FECHA : **JUEVES, 12 de noviembre de 2026**

HORA: **12,30h.**

LUGAR: Sala de I+D+I del Dpto. Puerta Nº B028 – P. Baja del Edif. de la ETSII – Campus Muralla del Mar

ABSTRACT:

Populations occupy in fragmented habitats and disperse from one cite to another. Populations spent some time to travel from one location to another which is termed as travel time (dispersal delay). We develop a predator-prey model where local patches (nodes) are connected via delayed dispersal. We explore how delay and dispersal can shape population dynamics. The linearized stability of such models whose characteristic function is a quasipolynomail and may possesses in_nite number of eigenvalues. We examine the location of these eigenvalues in the complex plane and determine the transversality condition at the Hopf bifurcation threshold. The isolated patch can exhibit at most two coexisting equilibria. However, dispersal may generate multiple asymmetric stable equilibria inducing bistability and tri-stability among coexisting states. A key result is the existence of a stable coexisting asymmetric pair even when the corresponding within-patch system admits no stable coexistence steady state. This reects the positive role of dispersal in recovering populations from extinction. Various stability classi cations are presented to highlight the e_ect of increasing dispersal delay on the combined stability behavior of symmetric and asymmetric equilibrium pairs. The mathematical tools, computational techniques, and ecological principles derived from the model might induced new knowledge in this domain.