Journée des Thésards du Labo EDP

23 juin 2022

Salle Abdelmajid TRIKI

(Salle des Séminaires n° 3)

Département de Mathématiques

Faculté des Sciences de Tunis

09h30-11h (mini-cours) :

Fethi Kadhi (Univ. Manouba)

Titre : ***Introduction à la théorie des catégories*****.**

Résumé : On présente les concepts de base en théorie des catégories. A travers des exemples bien choisis, on introduit les foncteurs, les transformations naturelles, les représentables, les adjoints. On démontre le théorème fondamental en théorie des catégories. Quelques applications seront discutées..

11h-11h30: Pause-café

11h30-12h (Conférence)

Mohamed ANTABLI (FST)

Title : Homoclinic solutions in R^2 for singular hamiltonian systems with weak force potentials.

Résumé : We study the existence of homoclinic solutions for a class of singular hamiltonian systems

$$q^{¨} + V'(q)=0 \qquad \text{(HS)}$$

where $q : R \to R^2$ and $V \in C^2(R^2 \setminus \{e\}, R)$ is a potential with a singularity at a point $e \neq 0$. We consider V which behaves like $-1/|q - e|^{\alpha}$ as $q \to e$ with $\alpha \in]1,2[$. Under the assumption 0 is a strict global maximum for V , we establish the

existence of a homoclinic solution emanating from 0, i.e. a solution q of (HS) such that : $q \neq 0$ and $q(t)$, $q'(t) \to 0$ as $t \to \pm\infty$

12h-14h: Déjeuner

14h00-15h30 (mini-cours) :

Mohamed MAJDOUB (Univ. Dammam)

Title*: *Blow-up phenomena for nonlinear evolution equations

Abstract: An evolution equation is a partial differential equation that describes the time evolution of a physical system starting from given initial data. Evolution equations arise from many areas of applied and engineering sciences. Starting with the seminal works of Kaplan and Fujita, a great number of papers and techniques concerning blowing-up solutions of evolution equations of various types appeared during the last sixty years. The objective of this mini course is to report on the cutting-edge development of the blow-up for nonlinear evolution equations and their applications. We will focus on Fujita-type results and critical exponents for various parabolic and hyperbolic problems.

5h30-16h00: Pause-café

16h00-16h30 (Conférence) :

Jihed Hedhly (FST)

Titre : Eigenvalue ratios for Sturm-Liouville Problems.

Résumé : In this talk, we give uniform and optimal estimates of the eigenvalue ratios $\frac{\lambda n}{\lambda m}$ of various equations of mathematical physics: Vibrating string equations, Schrodinger equations and Sturm-Liouville equations. More precisely, we prove that the eigenvalues of the problem : $-y''=\lambda r(x)\, y$

with Dirichlet boundary conditions satisfy the upper bound estimate

$$\frac{\lambda n}{\lambda m} \leq \frac{n^2}{m^2} \qquad (1)$$

for single-well density r. We also prove that the eigenvalues of the problem: -(p(x)y')'+q(x)y=λ r (x)y, satisfy the same estimate (1).