Mathematical analysis of some models arising in population dynamic.

By Prof Hamidou TOURE
University of Ouagadougou,
03 BP 7021 Ouagadougou 03
Burkina Faso.

A b s t r a c t

In this talk, we study the existence and regularity of solutions for some partial functional integrodifferential equations in Banach spaces. We suppose that the undelayed part admits a resolvent operator in the sense given by Grimmer in [R. Grimmer, Resolvent operators for integral equations in a Banach space, Transaction of American Mathematical Society 273 (1982) 333–349]. The delayed part is assumed to be locally Lipschitz. Firstly, we show the existence of the mild solutions. Secondly, we give sufficient conditions ensuring the existence of the strict solutions.The study is applied to some model of arising in population dynamics.

For illustration, we propose to study the existence of solutions for the following model of population dynamic

$\frac{\partial z(t,x)}{\partial t} = \frac{\partial^2}{\partial x^2} z(t,x) + \int_0^t \alpha(t-s) \frac{\partial^2}{\partial x^2} z(s,x)ds + \int_{-r}^0 g(t, z(t+\theta, x))d\theta$ for $t \geq 0$ and $x \in [0, \pi]$,

$z(t, 0) = z(t, \pi) = 0$ for $t \geq 0$,

$z(\theta, x) = \varphi_0(\theta, x)$ for $\theta \in [-r, 0]$ and $x \in [0, \pi]$.

where g : R+×R in R is continuous and Lipschitzian with respect to the second argument, α: R+ in R is bounded uniformly continuous, continuously differentiable and α' is bounded uniformly continuous, the function φ_0: $[-r, 0]\times[0, \pi]$ in R will be specified.