ABSTRACT

This thesis concerns the regional optimal control of distributed bilinear systems. We begin by studying the existence and uniqueness of solutions for bilinear evolution equations, which model a large class of real problems. Next, we consider the regional minimum energy control problems governed by a parabolic bilinear distributed system. We give methods of solution using quadratic problems and optimality systems. Furthermore, we propose a solution of the regional minimum energy control problem governed by a hyperbolic bilinear distributed system. This problem consists in minimizing the norm of the command under constraint. The problem is solved using optimality systems and by considering a set of quadratic problems. The results are successfully tested by examples and simulations, and the thesis ends by open problem and conclusion. The scientific contributions of this

thesis are the following:

 1- Participating in the scientific conference "The third international conference on research in applied mathematics and computer science ICRAMCS'2021,"and presenting a scientific paper entitled "Flux Control Problem for a Class of Bilinear Distributed Systems".

2- Submit a paper entitled "Flux problems using a regular bilinear optimal control" for publication in an international journal.