

MATHEMATICAL ANALYSIS OF ONE STRAIN  
HIV/AIDS MODEL COUPLED WITH  
ANTIRETROVIRAL THERAPY

Kelatlhegile Ricardo Gosalamang<sup>1 §</sup>, Huang Qingdao<sup>2</sup>, Wang Shuai<sup>3</sup>

<sup>1,2,3</sup>School of Mathematics

Jilin University

Changchun, 130012, P.R. CHINA

<sup>1</sup>e-mail: gkelatlhegile@yahoo.com

**Abstract:** We formulate a non linear ordinary differential equation and investigate a single strain HIV/AIDS model coupled with antiretroviral therapy. The disease-free equilibrium point is shown to be globally asymptotically stable whenever the epidemic threshold known as the reproduction number for the model is less than one. We apply linearization of Jacobian matrix to show that endemic equilibrium point is locally asymptotically stable whenever the reproduction number is greater than one. Finally, we analyze the reproduction numbers which shows that antiretroviral resistance will grow exponentially with increase of antiretroviral usage.

**AMS Subject Classification:** 92C60, 92D25

**Key Words:** HIV/AIDS model, one strain, antiretroviral therapy, threshold, stability

## 1. Introduction

Acquired Immunodeficiency syndrome (*AIDS*) which is caused by Human Immunodeficiency Virus (*HIV*), is indeed a major public health problem in developed and developing countries particularly in Africa, south of Sahara. Over two and half decades now the human species being terrorized emotionally, psychologically, physically, socially and economically by one of the horrific disease

---

Received: September 9, 2012

© 2012 Academic Publications

<sup>§</sup>Correspondence author