South East Asian J. of Mathematics and Mathematical Sciences
Vol. 17, No. 2 (2021), pp. 337-354

ISSN (Online): 2582-0850

ISSN (Print): 0972-7752

ON THE INTEGRAL SOLUTIONS OF BINARY QUADRATIC DIOPHANTINE EQUATION $ax^2 - bx = cy^2$

Ashokan Hari Ganesh and Kumaresan Prabhakaran*

Poompuhar College (Autonomous), Melaiyur – 609107,
Nagapattinam (Dt.), Tamil Nadu, INDIA

E-mail : ahariganesh84@gmail.com

*Annai Vailankanni Arts and Science College,
Thanjvur – 613007, Tamil Nadu, INDIA

E-mail : kprabu.maths@gmail.com

(**Received:** *Nov. 30, 2020* **Accepted:** *Jun. 13, 2021* **Published:** *Aug. 30, 2021)*

Abstract: In this paper, we show that the Diophantine equation $ax^2 - bx = cy^2$ in positive integers x, y, a, b, c has infinitely many solutions where ac is not a square. We transform the above equation into a Pellian equation to find its infinitely many integer solutions only when ac is not a square. Finally, we present some recurrence relations for (x, y).

Keywords and Phrases: Diophantine Equation, Quadratic Equation, Integral Solutions, Pell's Equation, hyperbola.

2020 Mathematics Subject Classification: 11DXX, 11D09.

1. Introduction

The aim of this paper is to find the general solution of non-homogenous Diophantine equation of the form

$$ax^2 - bx = cy^2.$$

This equation is considered as a more general form of the equation introduced in [19]. Moreover, the equation is a special form of the Diophantine equation