IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

A Glimpse On Finding Integer Solutions to Quaternary Quadratic Diophantine Equation $xy+4zw=(x+y)(z+w)$

J. Shanthi[1*], M. A. Gopalan[2], Sharadha Kumar[3]
Assistant Professor, Department of Mathematics[1]
Professor, Department of Mathematics[2]
Research Scholar, Department of Mathematics[3]
Shrimati Indira Gandhi College, Affiliated to Bharathidasan University, Trichy, Tamil Nadu, India[1,2]
National College, Affiliated to Bharathidasan University, Trichy, Tamil Nadu, India[3]
shanthitharshi@gmail.com, mayilgopalan@gmail.com, sharadhak12@gmail.com
Orcid id :0009-0008-5945-410X, Orcid id :0000-0003-1307-2348, Orcid id :0000-0002-0509-6158

Abstract: *This paper aims at finding patterns of solutions in integers to quaternary quadratic diophantine equation given by* $xy+4zw=(x+y)(z+w)$ *.Substitution technique and factorization method are utilized to obtain varieties of integer solutions. It is worth to observe that the introduction of the transformations reduce the quadratic equation with four unknowns to solvable Pythagorean equation. A few relations among the solutions are presented.*

Keywords: Quaternary quadratic equation, Homogeneous quadratic equation, Integer solutions

Notations:

$$t_{3,n}=\frac{n(n+1)}{2}$$

$$P_n^3=\frac{n(n+1)(n+2)}{6}$$

$$P_n^4=\frac{n(n+1)(2n+1)}{6}$$

$$P_n^5=\frac{n^2(n+1)}{2}$$

DOI: 10.48175/568