International Journal of Advanced Research in Science, Engineering and Technology

Vol. 13, Issue 3, March 2026

ISSN: 2350-0328

IMPACT FACTOR 7.150

Integer Design of Exponential Solutions to Diophantine Equations in Complex Stoichiometry Networks: A Pythagorean Parametrization Approach

Dr T SRINIVAS

Department of FME, Associate Professor, Audi Sankara Deemed to be University, Gudur bypass, Gudur, SPSR NELLORE-524101

ABSTRACT: This paper explores a systematic framework for the **Derivation of integer solutions** within complex networks by formulating atom-balance constraints as systems of **Diophantine equations**. By bridging algebraic number theory with chemical analysis, this approach ensures the rigorous conservation of mass and charge, fundamental to accurate molecular modelling. The methodology utilizes parametrization and classical forms (such as Pythagorean relations) to define the solution space of feasible integer stoichiometric coefficients. In this paper focused on finding the general exponential integer solution of
$\boldsymbol{\alpha(X^m + Y^m)^2(21U^2 + V^2) = T^2(C^2 + D^2)(Z^2 - W^2)P^\beta}$. With $\alpha, \beta, m > 0, and\ x < y < w < z$.
In a reaction network, X, Y, C, D represent the stoichiometric coefficients or the flux rates of specific pathways. By using U ,V, Z, W as "design parameters," , can generate an infinite set of integer-consistent networks that satisfy the conservation laws of the system.

KEY WORDS: Diophantine Equation, exponential, Pythagorean triplet, Integer design..

I. INTRODUCTION

The intersection of **algebraic number theory** and **organic chemistry** provides a rigorous mathematical framework for modelling complex reaction networks. At the heart of this intersection lie **Diophantine equations**—polynomial equations restricted to integer solutions—which serve as the natural language for stoichiometry, where atoms and molecules must exist in discrete, whole-number quantities.
While standard chemical balancing typically relies on linear systems, advanced molecular modelling frequently encounters non-linear dependencies. This introduction explores the application of higher-degree Diophantine equations, including **quintic forms**, to solve for integer consistency in sophisticated chemical systems involving more than eight unknowns.
In organic chemistry, empirical data such as molecular mass and elemental composition define a set of constraints. When these constraints are translated into mathematical terms, they form a system where:

- **Variables** represent atom counts or molecular fragments.
- **Linear Relationships** govern the conservation of mass and charge.
- **Non-linear Relationships** emerge during the modelling of reaction kinetics, combinatorial formation energies, or structural symmetries

As systems scale in complexity—such as in hypothetical organic synthesis networks involving intermediates like X, Y, U, V, C, D, Z, W, T, P—traditional balancing methods often fail. To navigate these high-dimensional solution spaces, this paper employs a multi-faceted computational strategy:

1. **Mathematical Induction:** To prove the consistency of integer solutions across scaling systems.
2. **Pythagorean Triplet Generation:** Used as a parametrization tool to satisfy quadratic constraints within the broader system.

International Journal of Advanced Research in Science, Engineering and Technology
ISSN: 2350-0328
IJARSET IMPACT FACTOR 7.150
Vol. 13, Issue 3, March 2026

3. **Trial-and-Error Computation:** A targeted algorithmic approach to identify minimal, physically feasible integer coefficients.

While the use of **quintic (fifth-degree) equations** is rare in routine laboratory work, they are vital in theoretical chemistry for encoding structural complexity. For example, if variables X and Y represent conjugated units raised to the fourth power, the resulting equation ensures that only specific integer sets correspond to chemically valid configurations. This synthesis of number theory and chemistry ensures **theoretical completeness**, providing a robust foundation for molecular structure prediction and advanced reaction engineering

II. LITERATURE REVIEW

The core of the methodology lies in representing a chemical network as a **stoichiometric matrix**, where rows correspond to chemical species and columns to elementary reactions. To manage the complexity of large-scale systems, the following computational steps are applied:

1. Dimensionality Reduction (SVD and STFA)

In complex organic networks, reactions are often redundant. use **Singular Value Decomposition (SVD)** and **Structured Target Factor Analysis (STFA)** to:

- Identify the **rank** of the system.
- Extract a **linearly independent basis** of reactions.
- Filter out "mathematical noise" to focus only on the fundamental chemical transformations.

2. Constraint-Based Integer Optimization

Once the basis is established, solve for the coefficients using **Integer Linear Programming (ILP)**. Unlike standard linear algebra, ILP ensures that:

- **Integrity:** All coefficients are integer numbers.
- **Sparsity:** seek the "simplest" reaction (usually coefficients < 10).
- **Directionality:** All coefficients remain positive, representing physically realistic mass flow.

3. Thermodynamic and Kinetic Validation

A mathematically balanced equation is not always a physically possible one. After the integer design phase, the model incorporates:

- **Gibbs Free Energy (Delta G):** To ensure the reaction is exergonic (spontaneous).
- **Kinetic Feasibility:** To verify that the reaction occurs at a measurable rate.
- **Monotonic Extents:** Ensuring that as the reaction progresses, the concentration of reactants strictly decreases while products increase

III. RESEARCH METHODOLOGY

In a complex stoichiometric network (like the Citric Acid Cycle), the number of unknowns (metabolites) often exceeds the number of equations.

Hence framework allows as follows:

1. Define the Solution Space: Use Diophantine systems to find all mathematically "legal" pathways.
2. Identify Minimal Solutions: Use combinatorial theory to find the "Null Space" of the stoichiometric matrix, identifying the most efficient biological pathway.
3. Handle Nonlinearity: Apply your exponential solutions to reactions where rates or concentrations follow non-standard power laws, which is common in enzyme kinetics.

In **Industrial Hydrocracking**, where long-chain hydrocarbons are broken down, the relationships are often nonlinear.

- **Linear Diophantine Equations** handle the atom counting.

International Journal of Advanced Research in Science, Engineering and Technology
ISSN: 2350-0328
Vol. 13, Issue 3, March 2026

- **Pythagorean Relations** are used to model the geometric constraints of catalyst surface area or molecular docking sites.
- **Exponential Integer Solutions** address the rate-limiting steps where the number of collisions/reactions scales non-linearly.

E.g.1: In this industrial reaction, gaseous ammonia (NH_3) and oxygen (O_2) react over a **solid platinum-rhodium gauze catalyst**. This is a classic non-homogeneous system where the "Integer Design" of the reaction path is critical for minimizing catalyst poisoning.

IV. MAIN PROPOSED WORK:

In particularly, **In this paper focusing on** A Study on integer design of exponential solution of given Diophantine Equation $\boldsymbol{\alpha(X^m + Y^m)^2(21U^2 + V^2) = T^2(C^2 + D^2)(Z^2 - W^2)\, P^\beta}$

Explanation:

Let x = $k^n, y = k^{n+1}, z = k^{n+3}, w = k^{n+2}, p = k^n, U = 2^n, V = 2^{n+1}, T = 5(3)^n$
Consider $\alpha(\boldsymbol{X^m + Y^m})(\boldsymbol{21U^2 + V^2}) = \alpha k^{mn}(1 + k^m)^2(5(3)^n)^2$
Again consider $(Z^2 - W^2)\boldsymbol{P^\beta} = k^{(2+\beta)n}(k^6 - k^4)$.
It follows that $\boldsymbol{\alpha(X^m + Y^m)^2(21U^2 + V^2) = T^2(C^2 + D^2)(Z^2 - W^2)\, P^\beta}$ implies that
$\alpha k^{mn}(1 + k^m)^2(5(3)^n)^2 = (C^2 + D^2)k^{(2+\beta)n}(k^6 - k^4)(5(3)^n)^2$ implies
$\alpha(1 + k^m)^2 = k^{(2+\beta-m)n}(C^2 + D^2)(k^6 - k^4)$.
Solve for α, whenever ($C, D, 1 + k^m$) is a Pythagorean Triplet.
From the References [1],[2],[3],[4],[5],[6],[7],[8],[9],[10],[11],[12] there is so many methods to generate Pythagorean triplet,

$$S_1 = \left\{(x, y, z): \frac{z}{y} = 1 + \frac{2}{x^2 - 1} \text{ if } x \text{ is an odd prime number or its power}\right\}$$

$$S_2 = \left\{(x, y, z): \frac{z}{y} = 1 + \frac{2}{\left(\frac{x}{(2p-1)^2}\right)^2 - 1} \text{ if } x \text{ is an odd composite or its Power, for some } p = 1,2,3\ldots\right\}$$

$$S_3 = \left\{(x, y, z): \frac{z}{y} = 1 + \frac{2}{\left(\frac{x}{2}\right)^2 - 1} \; if\ x\ is \text{ geometric power of } 2\right\}$$

$$S_4 = \left\{(x, y, z): \frac{z}{y} = 1 + \frac{2}{\left(\frac{x}{2p^2}\right)^2 - 1}, \text{otherwise (x is even composite or its power)}\right\}.$$

now I chosen one of the technique of
if r is an even number, then (r, $\left(\frac{r}{2}\right)^2 - 1, \left(\frac{r}{2}\right)^2 + 1$) is a Pythagorean triplet.
If r is an odd number, then (r, $\frac{r^2-1}{2}, \frac{r^2+1}{2}$) is a Pythagorean triplet.
From the References [1], we know that ($C, D, 1 + k^m$) becomes a Pythagorean Triplet with $C = (2k^m)$, $D(k^m - 1)$, $\boldsymbol{C^2 + D^2 = (1 + k^m)^2}$. Hence $\alpha = k^{(2+\beta-m)n}(k^6 - k^4)$.
Hence $\alpha(\boldsymbol{X^m + Y^m})^2(\boldsymbol{21U^2 + V^2}) = \boldsymbol{T^2}(C^2 + D^2)(Z^2 + W^2)P$ having integer design of solution is parameterized by integers k and n, with variables defined as:
x = $k^n, y = k^{n+1}, z = k^{n+3}, w = k^{n+2}, p = k^n, \alpha = (k^6 - k^4), C = 2k^n, D = k^n - 1,$
$U = 2^{n+1}$, $V = 2^n$ and $T = 5(3)^n$

Verification: Consider **LHS**
$\alpha(\boldsymbol{X^m + Y^m})^2(\boldsymbol{6U^2 + V^2}) = k^{(2+\beta-m)n}(k^6 - k^4).(\boldsymbol{k^{mn} + k^{mn+m}})^2(5(3)^n)^2 = \boldsymbol{k^{(2+\beta)n}}(k^6 - k^4)(\boldsymbol{1 + k^n})^2(5(3)^n)^2$.

International Journal of Advanced Research in Science, Engineering and Technology

ISSN: 2350-0328

Vol. 13, Issue 3, March 2026

Consider RHS

$$T^2(C^2+D^2)(Z^2-W^2)P^{\beta} = (5(3)^n)^2(1+k^n)^2(k^{2n+6}-k^{2n+4})k^{\beta n}$$
$$= k^{(2+\beta)n}(k^6-k^4)(1+k^n)^2(5(3)^n)^2.$$

Hence LHS = *RHS*.

V. CONCLUSION

The conclusion of this research highlights the powerful synergy between abstract number theory and practical chemical engineering. By framing stoichiometry as a system of **integer Diophantine equations**, we move beyond simple balancing into a rigorous, computationally scalable territory. This describes the **vector summation of dipoles** or **force constants** in a molecule with specific geometry. For instance, if two bonds are perpendicular, the resultant force or polarity is the root sum of their squares.

REFERENCES

[1]. Thiruchinapalli, S., Ashok Kumar, C. (2024). Construction Of Pythagorean And Reciprocal Pythagorean N-Tuples. In: Accelerating Discoveries In Data Science And Artificial Intelligence II. ICDSAI 2023. Springer Proceedings In Mathematics & Statistics, Vol 438. Springer, Cham. Https://Doi.Org/10.1007/978-3-031-51163-9_4

[2]. Srinivas Thiruchinapalli, Sridevi Katterapalle (2024). A New Approach To Determine Constant Coefficients In Higher Order Linear Recurrence Relations And Repeated Steps Of Their Residues With M[th] Integer Modulo Of Some Fibonacci Type Numbers. In AIP Conf. Proc. 2986, 030177 .Https://Doi.Org/10.1063/5.0192504

[3]. Srinivas Thiruchinapalli, Sridevi Katterapalle (2022). A New Approach To Define A New Integer Sequences Of Fibonacci Type Numbers With Using Of Third Order Linear Recurrence Relations. In AIP Conf. Proc. 2385, 130005 Https://Doi.Org/10.1063/5.0070691

[4]. Dr.THIRUCHINAPALLI SRINIVAS (2024). Additive And Multiplicative Operations On Set Of Polygonal Numbers, QEIOS. Https://Doi.Org/10.32388/MY0OLE

[5]. Dr.T. Srinivas[1*], Dr. C. Ashok Kumar[2] And K. Neeraja[3] (2024). An Enumerative And Analytical Study Of The Sustainable Energy In An Economic Perspectives, International Journal Of Business & Management Research 12 (2), Volume 6. Doi.Org/10.37391/IJBMR.120204

[6]. Sridevi, K., & Srinivas, T. (2023). Transcendental Representation Of Diophantine Equation And Some Of Its Inherent Properties. Materials Today: Proceedings, 80, Part , Pages1822-1825. Https://Doi.Org/10.1016/J.Matpr.2021.05.619

[7]. Sridevi, K., & Srinivas, T. (2023). Existence Of Inner Addition And Inner Multiplication On Set Of Triangular Numbers And Some Inherent Properties Of Triangular Numbers. Materials Today: Proceedings, 80, Part 3, Pages 1760-1764. Https://Doi.Org/10.1016/J.Matpr.2021.05.502

[8]. Sridevi, K., & Srinivas, T. (2023). Cryptographic Coding To Define Binary Operation On Set Of Pythagorean Triples. Materials Today: Proceedings, 80, Part 3, Pages 2027-2031. Https://Doi.Org/10.1016/J.Matpr.2021.06.102

[9]. Dr T SRINIVAS (2025). "A Study On Integer Design Of Exponential Solutions Of Diophantine Equation (X^4+Y^4)^B (P^2+Q^2+R^2+S^2)=C(T^2+U^2)(Z^2-W^2) A^B With A>0,B>1,P Is Odd And Y<X<W<Z. INTERNATIONAL JOURNAL OF ADVANCED SCIENTIFIC AND TECHNICAL RESEARCH (IJASTR), Vol. 15, No. 6, 2025, Pp. 269-274. DOI: 10.26808/RS.2025.20bc63

[10]. Dr T SRINIVAS (2025). "A Study On Integer Design Of Exponential Solutions Of Diophantine Equation (X^4-Y^4)^B (P^2+Q^2+R^2+S^2)=C(T^2+U^2)(Z^2-W^2) A^B With A>0,B>1,P Is Odd And Y<X<W<Z". INTERNATIONAL JOURNAL OF ADVANCED SCIENTIFIC AND TECHNICAL RESEARCH (IJASTR), Vol. 15, No. 6, 2025, Pp. 263-268. DOI: 10.26808/RS.2025.8a7b97.

[11] Srinivas, T., & Sridevi, K. (2021, November). A New Approach To Define Algebraic Structure And Some Homomorphism Functions On Set Of Pythagorean Triples And Set Of Reciprocal Pythagorean Triples " In JSR (Journal Of Scientific Research) Volume 65, Issue 9, November 2021, Pages 86-92.

[12] Sridevi, K., & Srinivas, T. (2020). A New Approach To Define Two Types Of Binary Operations On Set Of Pythagorean Triples To Form As At Most Commutative Cyclic Semi Group. Journal Of Critical Reviews, 7(19), 9871-9878

[13] Srinivas, T. (2023). Some Inherent Properties Of Pythagorean Triples. Research Highlights In Mathematics And Computer Science Vol. 7, 156-169.

[14]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2+W^2)^2P^{\beta}$ With $\alpha>0$, $\beta=1,2,3,4,5,6,7$ and $x<y<w<z$. International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.

[15]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2-W^2)^2P^{\beta}$ With $\alpha>0$, $\beta=1,2,3,4,5,6,7$ and $x<y<w<z$. International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.

[16]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2+W^2)\ P^{\beta}$ With $\alpha>0$, $\beta=1,2,3,4,5,6,7$ and $x<y<w<z$. International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.

[17]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^{\beta}$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-2882.

[18]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2+W^2)P^{\beta}$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28

[19]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(3U^2+V^2)=T^2(C^2+D^2)(Z^2+W^2)P^{\beta}$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28

International Journal of Advanced Research in Science, Engineering and Technology

ISSN: 2350-0328

Vol. 13, Issue 3, March 2026

[20]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28.
[21]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)(\gamma U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha, \beta>0, \gamma=2,3$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[22]. Srinivas,T.,G.Sujatha(2025). Solving For Stoichiometric Coefficients Of Chemical Diophantine Equation $\alpha(X^4+Y^4)^2(5U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[23]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2+W^2)^2P^\beta$ With $\alpha>0$, $\beta=1,2,3,4$,5,6,7 and $x<y<w<z$.
International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.
[24]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2-W^2)^2P^\beta$ With $\alpha>0$, $\beta=1,2,3,4$,5,6,7 and $x<y<w<z$.
International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.
[25]. Srinivas,T.(2025). A Study on Integer Design of Exponential Solutions of Diophantine Equations $\alpha(X^4+Y^4)^2=(C^2+D^2)(Z^2+W^2)\ P^\beta$ With $\alpha>0$, $\beta=1,2,3,4$,5,6,7 and $x<y<w<z$.
International Journal of Advanced Research in Science, Engineering and Technology Vol. 12, Issue 10, October 2025.
[26]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-2882. [30].
[27]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2+W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[28]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(3U^2+V^2)=T^2(C^2+D^2)(Z^2+W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[29]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)^2(2U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28.
[30]. Srinivas,T.(2025). A Study On Integer Design Of Solutions Of Diophantine Equation $\alpha(X^4+Y^4)(\gamma U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha, \beta>0, \gamma=2,3$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[31]. Srinivas,T.,G.Sujatha(2025). Solving For Stoichiometric Coefficients Of Chemical Diophantine Equation $\alpha(X^4+Y^4)^2(5U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ With $\alpha>0,\beta=1,2,3,4,5,6,7$ *and* $x<y<w<z$, 2025 IJCRT | Volume 13, Issue 11 November 2025 | ISSN: 2320-28
[32]. Srinivas,T.,G.Sujatha(2025), SOLVING FOR STOICHIOMETRIC OEFFICIENTS OF CHEMICAL DIOPHANTINE EQUATION $\alpha(X^4+Y^4)^2(5U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ WITH $\alpha>0,\beta=1,2,3,4,5,6,7$ and $x<y<w<z$. International Research Journal of Modernization in Engineering Technology and Science Volume:07/Issue:11/November-2025.
[33]. Srinivas,T.,G.Sujatha(2025), Integer Design Of Solutions Of One Of The Complex Stoichiometric Reaction System $\alpha(X^4+Y^4)^2(21U^2+V^2)=T^2(C^2+D^2)(Z^2-W^2)P^\beta$ WITH $\alpha>0,\beta=1,2,3,4,5,6,7$ and $x<y<w<z$. YMER || ISSN : 0044-0477
[34]. Srinivas,T (2025). A STUDY OF k-GONAL NUMBERS, Palestine Journal of Mathematics, Vol 14 (Special Issue IV), (2025) , 1–17.
[35]. Srinivas,T.,K.Umadevi(2025), INTEGER DESIGN OF SOLUTIONS OF ONE OF THE DIOPHANTINE EQUATIONS $\alpha(X^4 + Y^4)(P^2 + Q^2 + R^2 + S^2) = (T^2 + U^2)(C^2 - D^2)(Z^2 - W^2)P^\beta$ WITH X<Y<W<Z and P is ODD, $\alpha > 0$, $\beta > 0$. YMER || ISSN : 0044-0477,Volume 24,issue 11.
[36]. Srinivas,T.,K.Umadevi(2025), INTEGER DESIGN OF SOLUTIONS OF ONE OF THE DIOPHANTINE EQUATIONS $\alpha(X^4 + Y^4)(P^2 + Q^2 + R^2 + S^2) = (T^2 + U^2)(C^2 - D^2)(Z^2 + W^2)P^\beta$ WITH X<Y<W<Z and P is ODD, $\alpha > 0$, $\beta > 0$. International Research Journal of Modernization in Engineering Technology and Science Volume:07/Issue:11/November-2025.
[37]. Srinivas, T., Umadevi, K., Anitha, V., Babu, L.M. (2025). Role of Corporate Social Responsibility of Banks in Emerging Markets in India. In: Mishra, B.K., Rocha, Á., Mallik, S. (eds) International Conference on Technology Advances for Green Solutions and Sustainable Development. ICT4GS 2024. Information Systems Engineering and Management, vol 56. Springer, Cham. https://doi.org/10.1007/978-3-031-94997-5_8
[38]. Srinivas, T., Ashok Kumar, C., Appa Rao, N., Neeraja, K. (2025). Supply Chain Management for Coconut Farmers to Formulate New Marketing Strategies. In: Mishra, B.K., Rocha, Á., Mallik, S. (eds) International Conference on Technology Advances for Green Solutions and Sustainable Development. ICT4GS 2024. Information Systems Engineering and Management, vol 56. Springer, Cham. https://doi.org/10.1007/978-3-031-94997-5_18
[39]. Srinivas,T. (2026), A STUDY ON INTEGER DESIGN OF SOLUTIONS OF DIOPHANTINE EQUATION $\alpha(p^3 + q^3 + r^3)(X^4 + Y^4)(\gamma U^2 + V^2) = T^2(C^2 - D^2)(Z^2 - W^2)S^\beta$ WITH $\alpha > 0, \beta > 0, \gamma = 2,3$ and $X < Y < W < Z$,. INTERNATIONAL JOURNAL OF COMPUTER APPLICATION (IJCA), Vol. 16, no. 1, 2026, pp. 11-21. DOI: 10.26808/RS.2026.311c51
[40]. Srinivas,T. (2026), INTEGER DESIGN OF SOLUTIONS OF ONE OF THE DIOPHANTINE EQUATIONS $\alpha(X^4 + Y^4)(P^2 + Q^2 + R^2 + S^2) = (T^2 + U^2)(a^3 + b^3 + c^3)(C^2 - D^2)(Z^2 - W^2)P^\beta$ WITH X<Y<W<Z and P is ODD, $\alpha > 0, \beta > 0$, International Journal of Advanced Research in Science, Engineering and Technology Vol. 13, Issue 1, January 2026
[41]. Srinivas, T., Ashok Kumar, (2021). Using goal programming for transportation planning decisions problem in petroleum companies. Materials Today Proceedings. https://doi.org/10.1016/j.matpr.2020.11.322
[42]. Srinivas,T. (2026), Transcendental Pythagorean Cryptography: Symmetric Key Generation via Diophantine Triples and Algebraic Structures, International Journal of Advanced Research in Science, Engineering and Technology Vol. 13, Issue 1, January 2026.
[43]. SRINIVAS, Dr T. "Integer Solutions to Stoichiometric Constraints in Reactions of α(2^a+2^b)(X^4+Y^4)^2(6U^2+V^2)=2^(1) T^2 (C^2+D^2)(Z^2-W^2) P^β wth α>0,β=1,2,3,4,5,6,7 ,x<y<w<z,and a,b,l are coprime." International journal of pharmaceutical science and health Care, vol. 15, no. 6, 2026, doi:DOI: https://dx.doi.org/10.5281/zenodo.18264657
[44]. Srinivas,T. (2026), Inductive Parameterizations of Multi-Unknown Diophantine Equation Yielding Pythagorean Triples , International Journal of Advanced Research in Science, Engineering and Technology Vol. 13, Issue 1, January 2026.
[45]. Dr T SRINIVAS AND DR. K. DHANUMJAYA (2026). "Diophantine-Driven Elliptic Curves and Embedded Control via Optimized Solvers". *INTERNATIONAL JOURNAL OF COMPUTER APPLICATION (IJCA)*, vol. 16, no. 1, 2026, pp. 132-147
DOI: https://dx.doi.org/10.5281/zenodo.18359381
[46]. Dr T SRINIVAS AND DR. K. DHANUMJAYA (2026). "Integer Solutions Parameterized by k, m, n Yielding Unified Crypto-Control Pipelines". INTERNATIONAL JOURNAL OF ADVANCED SCIENTIFIC AND TECHNICAL RESEARCH (IJASTR), vol. 16, no. 1, 2026, pp. 208-220. DOI: https://dx.doi.org/10.5281/zenodo.18368265.

[47]. Dr T SRINIVAS AND DR. K. DHANUMJAYA (2026)., Parameterized Exponential Diophantine Equations for RNS-Encoded Pythagorean Triples in ECC and Embedded Control, International Journal of Advanced Research in Science, Engineering and Technology Vol. 13, Issue 1, January 2026.
[48]. Dr T SRINIVAS (2026). "A Study on Quadratic and Quintic Diophantine Equation in Embedded Cryptographic Coprocessors". *INTERNATIONAL JOURNAL OF COMPUTER APPLICATION (IJCA)*, vol. 16, no. 1, 2026, pp. 22/1-22/12. DOI: 10.26808/RS.2026.c1fb5f.
[49]. Dr T SRINIVAS (2026). "Quadratic Fibonacci, Pell Forms and High Dimensional Diophantine Design: Engineering Number Theoretic Constraints into Cryptographic Hardware". *INTERNATIONAL JOURNAL OF COMPUTER APPLICATION (IJCA)*, vol. 16, no. 1, 2026, pp. 23/1-23/17. DOI: 10.26808/RS.2026.353d4.
[50]. Thiruchinapalli, S., Ashok Kumar, C. (2024). Construction Of Pythagorean And Reciprocal Pythagorean N-Tuples. In: Accelerating Discoveries In Data Science And Artificial Intelligence II. ICDSAI 2023. Springer Proceedings In Mathematics & Statistics, Vol 438. Springer, Cham. Https://Doi.Org/10.1007/978-3-031-51163-9_4
[51]. Srinivas Thiruchinapalli, Sridevi Katterapalle (2024). A New Approach To Determine Constant Coefficients In Higher Order Linear Recurrence Relations And Repeated Steps Of Their Residues With M^{th} Integer Modulo Of Some Fibonacci Type Numbers. In AIP Conf. Proc. 2986, 030177 .Https://Doi.Org/10.1063/5.0192504

AUTHOR'S BIOGRAPHY

Full name	**DR THIRUCHINAPALLI SRINIVAS**
Science degree	PH.D
Academic rank	ASSOCIATE PROFESSOR
Institution	AUDISANKARA DEEMED TO BE UNIVERSITY, GUDUR,ANDHRA PRADESH