THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

The Nature's Graphs and Underlying Mystifications

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Abstract:
This Paper aims at providing the elementary properties of Graph Theory in the study of certain astronomical objects like constellation of stars through a table of similarities and dissimilarities compiled between the Euler Graph known to be fundamental to Graph Theory and the Big Dipper , known as an important major Constellation of Stars in the Astronomy . The graphical properties observed in the latter help to dispel the ancient superstitions of the then civilizations carried forward through the ages to modern times differently in different Continents of divergence of popular beliefs .

Keywords: Question –mark –graph , the plough graph , the Sapta-rishi , the Ursa Major , Euler Graph , Astronomy

1. Introduction

In today's advanced industrialized World , Search for solutions of problems of value to the mankind has been an ongoing process with the help of methods called Re-search .

Re-searches are mainly identified in terms of published papers / works /books by individual and/or combinations of Authors having rich theoretical as well as practical & partnershipped teaching experience cum learning with simultaneous applicative-presence of one or more minds during sessions of lectures / seminars / discourses /Conferences / exchanges at different levels of re-searching cum teaching stages to profess a field of knowledge .

One such field of knowledge is known as Graph Theory which of late has been referred to as a modern diversion to an upcoming field of earthly mathematical bonds between straight lines bearing and/or non-bearing curves with their crossing-joints emphasized .

At international level , a lot of headway is already made in the studies of properties of such bonds based on the shapely and non-shapely existences or designs with mathematical trespassing into zoological & botanical nomenclatures to investigate to explain mathematically characteristic properties such as Spider Graphs , trees , tree leaves , branches , flowers , forests, banana trees, caterpillars , lobsters ants and centipede graphs. In fact , the volume of creativity in Graph Theory terminology aptly deserves the title called Graph Theory Dictionary which has not yet been attempted to be compiled by any Scholar at any University in the entire World as on today .

Research in Graph Theory, as the name of the field suggests , is not only a noun for the reason of systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions but also a verb in action to draw schematic correlated diagrams to investigate systematically with willingness to make the re-search .

No one can deny the fact that so far whatever global fame garnered around the world by the past and present Researchers in Sciences & Mathematics can be aptly attributed to their doing acts of observations of the Nature and natural creations inside and outside one's natural sorroundings , say for example sake , that all trees are graceful ! But , it is a graph theory conjecture famously known as the ringel-kotzig-rosa conjecture -- all trees are graceful . Such an understanding is accessible to every person willing to make the search .

The guiding force is to focus at times on the general picture without pinpointed details to add to general picture . By the general picture is meant the manner in which graph theory is framed to create real-life questions such as the trivial circumstances of a river dividing the City of Konigsberg in Russia needing 7 bridges across it to traverse the island it created in the city inner generating a playful puzzling popular interest in the minds of the citizens in the early 1700s resulting into a game theory for those interested to do the betting that one should cross each of the 7 bridges once and only once while starting from any of the land cut-pieces to complete a non-stop walk .

Ultimately , a natural formation due to a river became an introduction to the Nature's natural existence as Graphs attracting human exploration abilities of what is what of underlying Mystifications .

In above example , the Nature's observer was the great Leonhard Euler (1707-1783) , the swedish mathematics teacher who in 1736 explained the underlying mystification as a correlated diagram of the 7 bridges of the Konigsberg and created the Euler Graph non-geometrically (Geometry was popular in those days) concentrating on relationships of bridges with the land- cut-pieces .

Thus, the Euler Graph emerged as the foundation and introduction to the field of Graph Theory generating two fundamental axioms and six basic theorems in the field .

The 7 bridges in brownish color with 4 land-supports in green color with the river in bluish color can be seen hereunder on the right-hand side in the picture while the effort of Euler to explain the bridges as bluish-arcs & lines numbering 7 with the 4 land-supports as dots of A, B , C & D on the left-hand side.
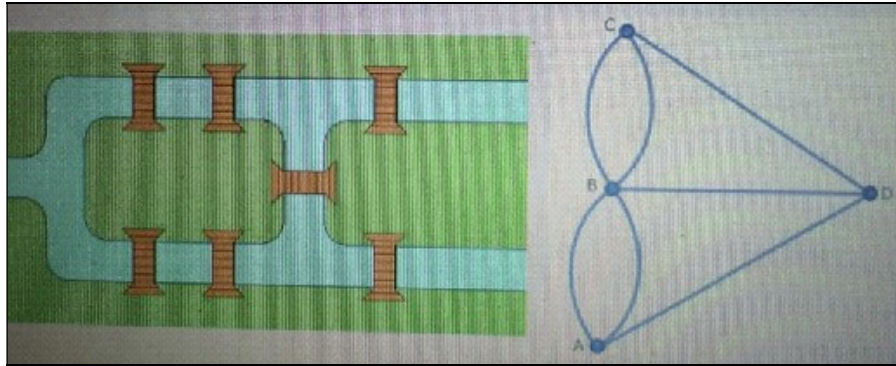
Therefore, one finds a glaring simplicity underlying the powerful technology called Graph Theory to solve real- life problems .

Every one of us differently interested in electronics , chemistry , management science , computer science , sociology , psychology , transportation and astronomy on the strength of being mere Nature's observers do come across variety of Graphs to exist in all these fields , leave alone when one is enmeshed in the details of this or that scheme of proving theorisations .

Nature's natural graphs implicitly give us word on design of nature at the initial creations and on ideal nature of social relationships existing as rediscoverable Graphs of Humanity . Nature is known for its Randomization *per se* . From the simplest totally independent outcomes to the inter-dependent outcomes , processes of mystification bearing randomness known as random processes in nature are underlying the mystifications as many natural phenomena .

Let us consider the other side of the Nature's non-earthy sky-bound mystification-formations , say the visible question-mark-shaped 7 stars(?), the Galaxies, the Nebula ,the Planets & the Black-Holes .

Can we imagine a suitable Graph Theory inferences developing out there in the high Sky , Infinite Space and Clouds ? We heard of twinkle twinkle little stars , milky ways, planets, nebulas and galaxies existing in an infinite fashion driving out blankness out of our thinking brains and adding to the figment of our imaginations , leave alone the current advances the space research teams have brought home .

There is a live example in this context for observation similar to that of Euler made by me which is the Nature's sky-mystification made up of 7 stars visible and appearing to the naked eye in the shape denoting a ' question -mark-form ' -- { ? }   which the professional astronomers usually call the big dipper. In different languages of different races of populations that had arrived to survive till their extinction from the face of the Earth , this mystification connoted several meanings and significances leading to strong beliefs about the creation of the Universe and   its Natural Mystifications underlying it in many cultures from time immemorial .

The Big Dipper, also known as the Plough or the Saptarishi (after the 7 rishis or sages as per the Indian Hindu astronomical belief), is an asterism of seven stars that has been recognized as a distinct set. The component stars are the 7 brightest of the formal constellation, the Ursa Major as per the modern Astronomy .

I prefer to say that the big dipper's shape looks like that of the symbol of a Question-mark (?) down- to-earth (practically and realastically). Seen below in the diagram , the question mark-shape appearance of the white colour dots .

The same in the horizontal position appears as the big dipper of black colour dots with connections shown in red coloured lines to look as a Graph drawn similar to that of attempted understanding of the Euler graph .

Take a look at the diagrams below to feel better the Question mark shaped 7-stars otherwise known as the Big Dipper on the next page .
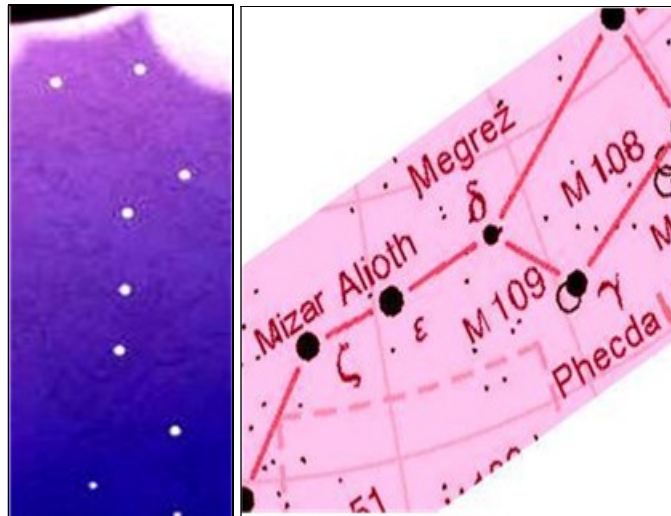
According to me , the Big Dipper's shapely 7 content-STARS in the Sky are akin to Euler's 7 Bridge problem studied by Euler in the year 1736 explained above .

Let me call it the Big Dipper Graph or the Plough Graph for the time being to make a research study of logicality and analogy with that of Euler Bridges Graph since the latter is the virtual first and foremost laid foundation stone of the field of Graph Theory or simply , Graph Properties since many of the concepts , theorems and problems of Graphs lie in the shadows of the Euler's works of 2 original axioms and 6 original theorems . Therefore , one can appreciate that in times of need and deed , the Graph Theory is an area of research whose past is always present , indeed .

Whether the 7-starred Big Dipper Graph in the high sky of the planet Earth also adheres to the properties of the Euler Graph on the Land of the planet Earth with the finite number of nodes and branches with a path for any two nodes is the work done in this paper studying to report as a matter of re-search for publication in your standard Journal of Science of repute.

2. A Table of Similarities & Dissimilarities

THE EULER GRAPH	THE BIG DIPPER GRAPH
1. Number of nodes/ vertices	
Finite, 4	Finite , 7
2. Number of branches / elements	
Finite, 7	Finite, 7
3. Vertex & Element connection features	
A. Incidence	A. Incidence
B. Degree of vertex	B. Degree of vertex
C. Adjacent Elements	C. Adjacent Elements
D. Adjacent Vertices	D. Adjacent Vertices
E. End Vertex not present	E. End Vertex present
F. End Element not present	F. End Element not present
G. Interior Vertex present	G. Interior Vertex present
H. Interior Element present	H. Interior Element present
I. Not a complete Graph	I. Not a complete Graph.
J. Not a null Graph	J. Not a null Graph
K. Elements in *series* not present	K. Elements in *series* present
L. Highest Vertex Degree is 5	L. Highest Vertex Degree is 3
M. Lowset Vertex Degree is 3	M. Lowest Vertex Degree is 1
N. Based on 2 Islands of Nature's random process .	N. Based on 7 Stars visible universal random process
O . 4 even number of vertices of odd Degrees	O . 7 odd number of vertices
of odd & even Degrees	
P. A Connected Graph	P. A Connected Graph
Q. No buckle/loop/self-edge	Q. No buckle/loop/self-edge
R. By virtue of popular- Bridges , it is an Edge-graph	R. By virue of Stars at Sky , it
of Eulerian-thinking on over-Bridges of River	is like Vertices-graph of
to walk over them exactly once with return to starting	Hamiltonian-thinking of
point.	Cities to pass through exactly once without return to starting point/City.

3. Conclusion

To conclude , the progress in the constructive structures of representative Graphs of several kinds of phenomena observed owing to the Nature & the Universe has given wide focus on engineering , physics as well as life sciences or other physical sciences like network analysis with associated areas of large -scale . Many Graph operations and charecteristic values called the Ranks and the Nullity for the projected connected subgraphs and the Part Graphs made the Society of Graphs . No wonder , one can be living still unheard of the technology of Graphs that gave surprises such as sociograms for understanding sociological structures of tribes & kinships , graphs-applied to disarmament –policies & global economics equilibrium, Graphs of computational linguistics and artificial intelligence parametres . Graphs expanded paved the way to the Graphs Applied which are preparatory solutions to the industrial progressions .

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