Stochastic Modeling and Applications
Vol. 25 No. 2 (July-December, 2021)
ISSN: 0972-3641

Received: 07th August 2021 *Revised: 10th November 2021* *Selected: 13th December 2021*

APPLICATIONS OF FUZZY HAMILTONIAN GRID AND EULERIAN GRIDS IN HUMAN LIFE

M. VIJAYA AND S. ANITHA

Abstract. Introduced the concept of happy obscure Applications of Hamiltonian Grid and Eulerian Grids in Human Life. Happy fuzzy grid for rotation-related grid and other grid are defined. Every compliment the fuzzy grid is a fuzzy labelings grid.

1. Introduction

The history of grid theory was specifically discovered in 1735 [4], when Swiss mathematician Leonhard Euler clarifies the Konigsberg Bridge the problem. A puzzle related to the probability of the Konigsberg Bridge problem Finding a way to each of the 7 bridges that reach the tributary river Crossing an island but never crossing any bridge twice. Euler denied that any such route had taken place. His evidence included only a substantial plan for bridges, but roughly he proved the initial theorem of grid theory. As handled in grid theory, the term grid does not refer to data charts, like bar maps. Rather, it refers to the set of nodes (i.e. dots or nodes) and lines (or dashes) connecting the ends. In 1973, initially, Kaufman Introduced ambiguous map. In 1975 [9] the theory of the ambiguous map was developed Ashraf Rosen field. Ambiguous grid theory, ambiguous synthesis theory and merging of grid the theory have been implemented in various fields of engineering and science. In 1975, Rosen field developed the theory, assuming vague relationships in vague sets vague maps.

Sloane and Graham [5] bring together the insight of a pleasant-sounding grid. A coupled grid with nodes and lines is alleged to be melodious if it possible to sticky tags the knots with separate fundamentals. Rogers call a grid powerfully p-elegant if the equally knot tags and link tags are diverse. To widespread both the strappingly p-elegant labelings and melodious labelings at the equal time, and have the sum of knot labels that can be constant to a bottom, E. Schmeichel and Sin-Min Shelter announce the well-chosen labelings. In this tabloid Section 2 take in basic explanations and in Section 3 consist of a new formation of well-chosen fuzzy grid, and several effects are conversed and in Section 4 take in decision.

Review of literature

In the best collective sagacity of the tenure, a grid is an well-organized brace $= (v, E)$ consist of a fixed of peaks or knots or facts organised with a set E of controls or bows or ranks, which are two part subclasses of (i.e. an verge is allied with two peaks, and that link takes the custom of the unordered pair lie of folks dual apexes). To side-step cloudiness, this nice of grid may be called just as futile and natural.

Grids can be hand-me-down to exemplary many brands of family members and developments in material, natural, societal and data systems. Many real teething troubles can be embodied by grids give emphasis to their submission to real-world classifications, the term complex is now and then defined to despicable a grid in which characteristics (e.g. names) are accompanying with the swellings and/or boundaries.

Grid theory is pretty increasingly noteworthy as it is pragmatic to other areas of sums, knowledge and machinery. It is being aggressively used in playing field as wide-ranging as biochemistry (genomics), electrical engineering (communiqué linkages and coding idea), PC art (set of rules and working out) and acts inquiries (setting up). The controlling combinatorial approaches start in grid model has also been castoff to show essential results in other zones of clean arithmetic.

In the carefully worked-out park of grid theory, a Hamiltonian route (or clear route) is a route in an undirected or directed grid that visits each peak closely formerly. A Hamiltonian set (or Hamiltonian trail) is a Hamiltonian route that is a set. Causal whether such routes and sets exist in grids is the Hamiltonian route tricky, which is NP-complete.

Hamiltonian routes and sets are called after William Rowan Hamilton who regarded the icosian apt, now also exclusive as Hamilton's mystery, which contains end a Hamiltonian set in the buff grid of the dodecahedron. Hamilton set this fiddly using the icosian calculus, an algebraic creation based on births of unity with many twins to the quaternions (also planned by Hamilton). This result does not shorten to chance grids.

Still, in the face of life baptized after Hamilton, Hamiltonian sets in polyhedral had also been unruly a year past by Thomas Kirkman, who, in sure, offered an case of a polyhedron without Hamiltonian series.

2. Preliminaries

Definition 2.1. Supposing that $(p;l)$ grid G has a correct labelings $f : v(G) \to (0;l)$, where p and l embodies the numeral of knot and lines one-to-one. The link tag $\phi(\mu)$ of both line $\mu v \in E(G)$ is sharp as $\phi(\mu v) = \lambda(\mu) + \gamma(v) \pmod 1$. If the link brand set $\phi(\mu v) : \mu v \in E(G) = [0; l-1]$ then we around both Gand f to be well-chosen.

Definition 2.2. What if that $(p;l)$ grid G has a good labelings $f : v(G) \to (l+1, l+2+\ldots+p+1)$ where p and l signifies the numeral of knot and numeral of lines singly. The link tag $\phi(\mu v)$ of every link $\mu v \in E(G)$ is clear $\phi(\mu) = \lambda(\mu)+\gamma(v)$ (mod p, l). Where $f = 0.001$ if $n \leq 3$ and $6 = 0.001$ if $n \geq 50$. If the link sticky tag set $\phi(\mu v) : \mu v \in E(G) = [1, l]$ then we can say Gis said to be appropriate fuzzy grid.

Definition 2.3 (Hamiltonian Sub grids)**.** Explanation (exterior peak). Let A be specific sub grid of the grid G. A peak $u \in v(A)$ is held to be an exterior peak of A if there exists an edge $\{u, v\} \in E(G)$ such that $u \in v(G - A)$.

3. Solicitations of GSM and Period Table Preparation

Fuzzy Grid hypothetical ideas are approximately cast-off to revision and prototypical innumerable applications, in poles separately capacities. They take in, study of fragments, manufacture of bonds in vibes and the study of jots. In the same way, fuzzy grid scheme is cast-off in sociology for case in point to measure artiste's science to catch prime way to implement certain jobs in economical atmospheres. To symbolize the manner of set degrade is cast-off. Here, the apogees epitomize the situations and the controls epitomize the travels.

3.1. Fuzzy Traveling Salesman Problem. FTSP is a well-known behavior based on the Fuzzy Hamilton set. Given the number of cities and the total travel of any city to any new metropolis given the bad behavior declaration, find the tour direction at the lowest price, officially visit each city once and visit the ready city. In ambiguous grid terms, the vertices of the ambiguous grid classify cities and classify the cost of wandering by cities (adjacent verticals) with edges, the wandering vendor problem is impartial.

This bad behavior is given as NP-hard. The plateau is computationally cruel by misbehaving, a large number of arithmetic and specific ways and means are known, so some cases have been explained in an argument with tens of 1000 of metropolises. The short answer would be to crack all the changes and see what the economy (using brutal power) is. The next time this approach is $O(V)$! Factor in the number of municipalities, so this interpretation is unreasonable for only 20 municipalities.

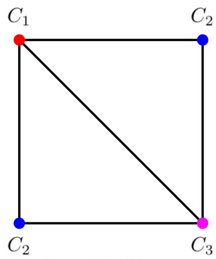
A self-motivating software design response solves the runtime problem of O (V2V) with bad behavior in mind. This means that it costs less to fold from the jerk vertex to complete the peak using the pronunciations stated in the government (Any vertex selected in Start Vertex Twitch). Since $V2V$ is the time problem $O(V)$ for responding to ancillary difficulties and each ancillary problem, the full operating time problem is $O(V2\ V)$.

3.2. Peak Coloring. Peak colorization is some of the best key ideas in vague phase theory, and second hand in various real-time submissions in processor knowledge. Different tan methods and payouts stay offered then they tin be castoff on a must base.

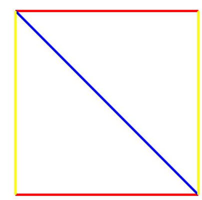
The appropriate color for the fuzzy grid is the skin tone of the peaks and edges, which have a very small number of shades, i.e. the two apogees should not be the identical color. The lower numeral of colors is called the color numeral and the grid alike collar is called the fuzzy grid.

3.3. Map skin colour and FGSM traveling telephone nets. Obscure groups Superior Portable (FGSM) is a movable telephone net where the geo radical part of the system does not speak in hexagonal states or cells. Each cell has a communiqué tower that joins to the portable headset inside the cell. All transport headphones pierce the cells in fellow citizens with the FGSM system.

Since FGSM is repeatedly classified on only four poles, the fact that a single four identifiers can be used to color cellular states is pure by the origin of the ambiguous phase theory. These four poles are individually ejected for the correct



Proper Vertex Coloring with Chromatic Number 3



Proper Edge Coloring with Chromatic Number 3

color of the color districts. As a result, the rules can be applied to any FGSM mobile phone connection repeatedly at four different rates. The authors agreed with the idea of shadows:

A map on the outside of the soft or sphere of influence is considered tiring, with four color propositional properties, the areas of a plot being considered to be continuously colored by a maximum of four different colors, i.e. the next two not the same color is assigned to the provinces. Now, a double grid merges by laying one peak inside each province of the plot and merger dual discrete peaks at one edge so that their corresponding provinces collectively cut off the entire area of their margins. Then the exact color of the elasticity of the two ambiguous phases is the correct color of the fertile map. Then, skin colour the parts of a planar fuzzy grid G is related to coloring the vertices of its dual phase and evil versa. By colorizing the plot segments using four color rebates, the four ratios are recurrent for that reason.

Distributing courses and queries to educators is one of the record chief questions if limits be located multiple areas. Faze philosophy dramas an imperative role in this bad behavior. The numbers of the “p” epoch plan given to the “t” teachers with “N” subjects should be arranged.

It ended up having an eye. The numbers of capacitances $t1, t2, t3, t4$, where the verticals are at a common fuzzy point (or a fuzzy phase of the bio-grid where its vertices U and V are set sets) are perpendicular. A question of tk and n numbers $n1, n2, n3, n4$, the nm apogee is attached to the ”pie” edges. It is assumed that in any old fashioned way every educator can still give a basis to a question and every question can be taught by a teacher. Think of history first. The agenda for this applies equally at the stage, on the other hand, parallel to the potential duty of the teacher to the questions taught in each period.

Consequently, the explanation for the scheduling tricky will be got by rift up the bounds of vague grid G into tiniest numeral of like. Also the ends ought to stay seized with tiniest possible digit of colors. This badly-behaved can also be re-joined by apex coloring course. “The mark grid $L(G)$ of G has the same digit of peaks and borders of G and two apices in $L(G)$ are allied by an verge iff the regular ends of g need a peak in joint. The route grid $L(G)$ is a plain grid and a proper peak skin tone of $L(G)$ gives an appropriate edge skin tone of G by the identical numeral of colors. So, the badly-behaved can be solved by conclusion least possible apt peak skin tone of $L(G)$.” For case in point, Think conclude here stand 4 Guides viz. t_1, t_2, t_3, t_4 and 5 topics say n_1, n_2, n_3, n_4, n_5 to be skilled.

The education prerequisite conditions $p = [p_{ij}]$ is given as.

P	n_1	n_2	n_3	n_4	n_5
t_1	2	0	1	1	0
t_2	0	1	0	1	0
t_3	0	1	1	1	0
t_4	0	0	0	1	1

The two-part grid is created as tails.

Lastly, the writers start that appropriate tan of the beyond talk about grid can be thru by 4 colors by funds of the peak skin tenor set of rules which clues to the buff tan of the mutual multigrain G. 4 colors are busy to mean to 4 epochs.

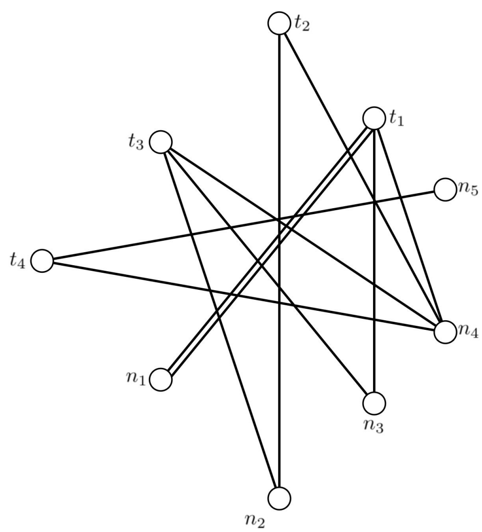


FIGURE 1. Two-part grid with 4 Coaches and 5 topics

	1	2	3	4
t_1	n_1	n_2	n_3	n_4

TABLE 1. *

The agenda for the 4 topics

3.4. Acquaintance Problem and fuzzy Grids. A set leader of an establishment was give lectures in a working out curriculum, a assemblage of 21 recently recruited apprentices of the corporation, who have bring together for the agenda. The forerunner who was fond of information was construction and statement as keep an eye on. In the intermediate of the 21 novices gathered here it could be that there are apprentices who know each other, novices who distinguish all others, novices who do not discern each other as well as novices who do not be acquainted with any person in the set. But present will be a beginner in this group who before now knows an even numeral (as well as the flush total zero) of extra apprentices. The right of the frontrunner appearances a petite mystifying then it is factual. Pardon do we do to display this claim? One mode is to create a list, for all of the 21 folks, of former apprentice's hip the set previously recognized near them. The data got container be treated, even though her possibly will be a tiny awkward, in edict to invention ready for all of the 21 trainees, the amount of other learners before now acknowledged near them. This will make known the fact of the due.

3.5. Handshaking Theorem. In some grid, the summation of the grades of the peaks is twofold the numeral of limits. Gamble we cruel the degree of a peak v in a grid $G = (v, E)$ by $d(v)$ and if G has q limits, then this proposition can be spoken as follows:

$$\Sigma v\epsilon v d(v) = 2q$$

This proposition is that a marginal data range (it is not a loop) occurs with double vertices, so that each apex degree is one. Therefore, in addition to the size of the corner, such a margin is calculated twice at each end of the margin. (A loop occurs at the top of the two spirals, thus subscribing to this peak of degree two.) At an ambiguous point, the peak with an equal fraction is compressed. The peak is called the peak and the peak with the odd degree is called the odd peak. The sum of the degrees of the flight nodes is a flat number, because we get consecutive numbers when we add any number of even numbers. But only the sum of odd odd numbers is equal. According to the handshake theorem, the number of odd verticals at an ambiguous point must be flat. Expansion At a point with odd numbers, the number of vertices of the odd fraction will be plane, so there must be at least one equal part at the apex. This is why in a cognitive problem with an odd number of trainers the team leader claims that at least one coach knows the number of other learners.

Note 3.1. In an Eulerian path or Eulerian circuit, a peak may be higher than the rear but not the edge! An Eulerian circuit forms and passes through a similar vertex. An ambiguous phase with Euler circuits is known as the Euler phase. For example the phase in $(A, B)(B, C)(C, E)(E, D)(D, C)(C, A)$ is an Eulerian circuit and therefore the dark phase is an Eulerian phase

Theorem 3.2. *Let $[d_i]_1^n$ be a degree sequence of a grid $G = (V, E), d_1 \leq d_2 \leq \ldots \leq d_n$. Each of the following gives the sufficient conditions for G to be Hamiltonian.*

(A) $1 \leq k \leq n \Longrightarrow d_k \geq \frac{n}{2}$ *(Dirac)*
(B) $uv \notin E \Longrightarrow d(u) + d(v) \geq n$ *(Ore)*
(C) $1 \leq k \leq \frac{n}{2} \Longrightarrow d_k > k$ *(Posa)*
(D) $j < k, d_j \leq j$ *and* $d_k \leq k - 1 \Longrightarrow d_j + d_k \geq n$ *(Bondy)*
(E) $d_k \leq k < \frac{n}{2} \Longrightarrow d_{n-k} \geq n - k$ *(Chvatal)*
(F) *For every i and j with* $1 \leq i \leq n, 1 \leq j \leq n, i + j \geq n, v_i v_j \notin E, d(v_i) \leq i$ *and* $d(v_j) \leq j - 1 \Longrightarrow d(v_i) + d(v_j) \geq n$ *(Las Vergnas)*
(G) $c(G)$ *is wide-ranging (Bondy and Chvatal)*

Proof. We first prove that $A \overset{(i)}{\Rightarrow} B \overset{(ii)}{\Rightarrow} C \overset{(iii)}{\Rightarrow} D \overset{(iv)}{\Rightarrow} E \overset{(v)}{\Rightarrow} F \overset{(vi)}{\Rightarrow} G$

(i) This fire is simply time-honored.

(ii) Adopt (C) is not true, so that near is a k with $1 \leq k \leq \frac{n}{2}$ and $d_k \leq k$. Before the made subgrid on the peaks $v_1, v_2, \ldots, v_k$ is a broad grid. For, if here are peaks i and j with $1 \leq i < j \leq k$ and $v_i v_j \notin E$, then $d_i + d_j \leq 2\ d_k < n$, disputing (B). Since $d_k \leq k$, each $d_i, 1 \leq i \leq k$, is adjacent to at most one $v_j, k+1 \leq j \leq n$. Also, $n-k > k$, as $k < \frac{n}{2}$. So there is a peak $v_j, k+1 \leq j \leq n$ not together to any of the apexes $v_1, v_2, \ldots, v_k$. For this v_j, we have $d_j \leq n-k-1$. But then $d_i + d_j \leq (n-k-1)+k = n-1$. Thus there is a $v_i v_j \notin E$ with $d_i + d_j \leq n-1$, disputing (B). Later showing (ii).

(iii) Adopt that (D) is not true, so that there exist j and k with $j < k, d_j \leq j, d_k \leq k-1$ and $d_i + d_j < n$. This gives $i = d_j < \frac{n}{2}$. But then $d_j \leq j$ gives $d_{d_j} \leq d_j$, since the sequenceis non-decreasing. Then, $d_i \leq d_j = i$. So near is a $i, 1 \leq i \leq \frac{n}{2}$ with $d_i \leq i$, contradicting (C). This proves (iii).

(iv) If (E) is not true, there is a k with $d_k \leq k < \frac{n}{2}$ and $d_{n-k} \leq n-k-1$. Then $d_k + d_{n-k} \leq n-1$. Setting $n-k = j$, we have $k < j, d_k \leq k, d_j \leq j-1$ and $d_j + d_k \leq n-1$. This denies (d) and so (iv) is shown.

(v) Assume that (F) is not real, so that nearby is a duo of peaks v_i and $v_j, i < j$ by $v_i v_j \notin E$ and profane (F). Elect i to be the tiniest such likely digit. Then by plain of $i, d_{i-1} > i-1$. Thus $d_i \geq d_{i-1} \geq i$ and later $d_i \leq i$, we get $d_i = i$. If $i \geq \frac{n}{2}$, we grow $d_i + d_j \geq 2d_i \geq n$, gain saying the ruin of (F). So, $i < \frac{n}{2}$. Thus, here is a $i, 1 \leq i < \frac{n}{2}$ with $d_i = i$. Now, if (E) is gratified, we have $d_{n-i} \geq n-i$ and since $j \geq n-i$, we get $d_j \geq d_{n-i} \geq n-i$. By minimality of $i, d_i = i$ and we have $d_j + d_i \geq (n-i)+i = n$, again reversing the ruin of (F). Thus denial of (F) infers denial of (E) and (V) is reputable.

□

4. Conclusion

With a meaning to bring to the announcement of fresh person who reads, some of the applications of fuzzy grid, particularly fuzzy Eulerian grids are piercing out in this paper. Present are a numeral of other attention-grabbing applications where fuzzy grids have institute their use. A rationalization of several of the other applications is particular the impression of happy unintelligible Presentations of Hamiltonian Grid and Eulerian Grids in Human Life. Happy fuzzy grid for rotation-related grid and other grid are defined. Every approval the fuzzy grid is a fuzzy labelings grid. The absorbed reader is heartened to rise to them and the locations in them for more niceties.

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M. Vijaya:Research Advisor, PG and Research Department of Mathematics, Marudupandiyar College, Thanjavur- 613403, Tamilnadu,India, (Affiliated to Bharathidasan University,Trichirappalli).

Email address: mathvijaya23@gmail.com

S. Anitha: Research Scholar, PG and Research Department of Mathematics, Marudupandiyar College, Thanjavur- 613403, Tamilnadu,India, (Affiliated to Bharathidasan University, Trichirappalli).

Email address: anithakarthick1715@gmail.com