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A study on Colour Graphs

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Abstract
As the coloring of graph is concerned that the two adjacent vertices will not have a same color. That is, all the vertices of the graph may and may not have the same color. For example if the graph is complete graph then all the vertices of the graph will contain the different colors. It the graph is regular graph then it may be possible that the two vertices which are not adjacent, will have the same color. The vertices in the graph may defined as the label and the graph which have the color is called the chromatic number. The chromatic number is directly associated of the different color of the graph.

Keywords: graph, colour

Introduction

A graph is a pictorial device which represents the relation between the data which is a measureable parameter in natural. A graph generates the relation between the different quantities and establishes the relation of the parameters. If one quantity changes then another parameter also changes. The graph is useful for summarizing the information which is very large in nature. The student can take help in the summarization of information by using these techniques. Every research obtains the data and data can be showed easily with the help of graphs. Graphs are helpful for defining the data in a convenient way. Graph denotes the relation between the different parameters and generated the useful information. A graph is providing the concepts that the parameter changes and provides the relation in useful manner. So that is way the graph is useful to provide the meaningful information.

Review of Literature

Samantha Dorfling (2017) [2] An outline property is any isomorphism-close class of graphs. A property is hereditary if, at whatever point an outline G is in whole, and H is a sub graph of G, by then H is in like manner in standard. For an innate graph property, positive entire number l and an outline G, let be the base number of tints anticipated that would hues the edges of G, to such a degree, to the point that any sub graph of G started by edges shaded with (at most) l tones is in chart. We consider the properties and εk, where contains all graphs of most noteworthy degree at most k and εk contains diagrams, whose fragments have at most k edges. We show that for graphs G of most noteworthy degree Δ we have and we use Erdos-Lovasz neighborhood lemma to exhibit that for.
Zeynep Ors Yorgancioglu (2015) [3] For a nontrivial associated chart G, focus colouring is a sort of colouring that is to colours the vertices of a diagram G is such a route, to the point that if vertices have distinctive separation from the middle then they should get diverse hues. Two adjoining vertices can get a similar colouring. The quantity of hues expected of such a colouring is called center coloring number Cc (G) of G. This colouring can be connected to pecking order issues to locate the quantity of structures, individuals, criteria and examinations, and so on. In addition it can be connected to quake movement issues to locate the quantity of settlements that are influenced by a seismic tremor. The middle colouring number of some notable classes of diagrams is resolved and a few limits are set up for the center colouring number of a chart as far as other graphical parameters.

Colour Graph

Let K: V $\rightarrow$ H is a distribution of colours. If G(K) is the (K, n)-graph, then the triple F(K) = (G(K), H, K) is said to be the coloured n-graph strongly associated with K or C(K, n)-graph; if J(K) is an (AK, K)-graph, then the triple T(K) = (J(K), H, K) is said to be coloured n-graph strongly-almost-associated with K or C(AK, n)-graph. Given a set H of colours and an n $\in$ N – {O}, let (Ω, o) be a sub-monoid (with unit-element) of the monoid (f (H, H), o) of all mappings h: H $\rightarrow$ H.

Theorem 1 (A): There exists a category $A^{K_{\Omega}^{H}}$, n [resp. K_{Ω}^{H}, n] wit hobjects all coloured n-graphs strongly-almost-associated [resp. strongly-associated] with distributions K of colours of H on sets V and with morphism all quadruples (T(K), T(K'), f, h) [resp. (F(K), F(K'), f, h)] where f is an SSC homomorphism of T(K) into T(K') [resp. of F(K) into F(K')] associated with h: H $\rightarrow$ H.

(B) There exist a category $A^{K_{\Omega,n}^{\perp H}}$ sub- category of $A^{K_{\Omega,n}^{H}}$ and of $K_{\Omega,n}^{H}$ with objects all triples $T^{\perp}$ (K) = ($J^{\perp}$ (K), H, K), the coloured n-graphs strongly-almost-associated with K, where $J^{\perp}$ (K) is the n-graph associated with K, minimal as regards $<$.
Proof Let T(K) = (J(K), H, K), T(K'), T(K') = (J(K'), H, K`), T(K``) = (J(K``), H, K``) be coloured n-graphs strongly-almost-associated [resp. let F(K) = (G(K), H, K), F(K`) =

(G(K\`), H, K\`), F(K\`\`) = (G(K\`\`), H, K\`\`) be coloured n-graphs strongly-associated] with K, K\`, K\`\` respectively; let f(h) be an SSC homomorphism of T(K) into T(K\`) [resp. of F(K) into F(K\`)] associated with h and let f(h\`) be an SSC homomorphism of T(K\`) into T(K\`\`) [resp. of F(K\`) into F(K\`\`)] associated with h\`. It follows that

K\`of (h)/V (J (K)) = h o K
K\`\` of (h\`)/V (J (K\`)) = h\` o K\`

Hence
K'' ○ f (h') / V (J K)) ○ f (h) / V (J (K)) = h' ○ K ○ f (h) / V (J (K)) = h' ○ h ○ K

This implies
K'' ○ (f (h') ○ f (h)) / V (J (K)) = (h' ○ h) ○ K

[resp. we have K' ○ f (h') / V (G (K)) = h ○ K, K'' ○ f (h') / V (G (K)) = h ○ K',

Which implies K '' ○ (f (h') ○ f (h) V (G(K)) = (h' ○ h) ○ K]
It follows that f (h') ○ f (h) is the SSC homomorphism f (h' ○ h) (h' ○ h ∈ Ω). Since for every T (K) [resp. F (K), the quadruple (T (K), T (K), $I_{J(K)}$, $I_{H)}$ [resp. (F (K), F (K), $I_{J(K)}$, $I_{K)}$] is an SC homomorphism, we have a category with the following composition

(T (K'), T (K''), f (h'), h') * (T K), T (K '), f (h), h)
= (T (K), T (K"), f (h' ○ h), h' ○ h)

[resp. (F (K'), F (K"), f (h'), h') * (F(K), F (K'), f (h), h) = (F (K), F (K"), f(h' ○ h) h' ○ h)].
Likewise, it is possible to show the statement B.

Theorem 2 Assigning to every morphism (T K), T (K'), f, h) [resp. (F (K), F (K"), f, h)] the morphism (T K), T (K'), f / J ⊥ (K), h), we obtain a subjective factor of A $K^{H}_{\Omega,n}$ [resp. $K^{H}_{\Omega,n}$] onto A $K^{\perp H}_{\Omega,n}$.

Proof: Observe that the categories A $K^{H}_{\Omega,1}$, $K^{H}_{\Omega,1}$ are subcategories of the category COL^{H}_{Ω} [9] whose objects are all colored 1-graphs C = (G, H, K), where K : V → H is a colouring of G, and whose morphisms are all quadruples (C, C', f, h), where f is a semi-coloured homomorphism of C into C' associated with h ∈ Ω.

Theorem 3: Let F, G be respectively the factors of A $K^{H}_{\Omega,n}$, and of A $K^{H}_{\Omega,n}$ onto $K^{\perp H}_{\Omega,n}$, defined in Th. 3.2. It follows that there exists a comma category (F ↓ G).
Proof: By previous theorem, we have the following diagram of categories and factors

$$A K^{H}_{\Omega,n} \xrightarrow{F} A K^{\perp H}_{\Omega,n} \xleftarrow{G} K^{H}_{\Omega,n}$$

Conclusion
It follows that it is possible to construct a Comma-category (F ↓ G) whose objects are all triples (A, B, p), where A [resp. B] is a coloured n-graph strongly-almost-associated [resp. strongly-associated] with distributions K of colours of H, i.e. an object of A $K^{H}_{\Omega,n}$ [resp. $K^{H}_{\Omega,n}$], and φ is a morphism of F (A) into G (B). further, for all pairs (a, b) where a, b are respectively morphisms of A_1 into A_2 and of B_1 into B_2 such that the following diagram is commutative.

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