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New Graph Of Graph

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Abstract

Constructing new graph from the graph's parameters and related notions in the way that, the study on the new graph and old graph in their parameters could be facilitated. As graph, new graph has some characteristics and results which are related to the structure of this graph. For this purpose, regular graph is considered so the internal relation and external relation on this new graph are studied. The kind of having same number of edges when this number is originated by common number of graphs like maximum degree, minimum degree, domination number, coloring number and clique number, is founded in the word of having regular graph.

Keywords: Regular Graph, Vertex, Degree, Numbers
AMS Subject Classification: 05C17, 05C22, 05E45, 05E14

1 Outline Of The Background

I'm going to refer to some books which are cited to the necessary and sufficient material which are covering the introduction and the preliminary of this outlet so look [**Ref.** [1], **Ref.** [2], **Ref.** [3], **Ref.** [4]] where **Ref.** [1] is about the textbook, **Ref.** [2] is common, **Ref.** [3] has good ideas and **Ref.** [4] is kind of disciplinary approaches in the good ways. Further references could be referred and could be addressed in **Refs.** [5–11].

2 Definition And Its Clarification

Definition 2.1. Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be old graph. **Δ-REGULAR** on $\mathcal{G}$ is a new graph in the way that, the set of vertices is the same as if every vertex has Δ edges where Δ is about old graph.

3 Relationships And Its illustrations

Theorem 3.1. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old graph and* **Δ-REGULAR** *is a graph on $\mathcal{G}$. Then $\Delta \leq \mathcal{O}(\mathcal{G}) - 1$.*

Theorem 3.2. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. If $\Delta = \mathcal{O}(\mathcal{G}) - 1$, then new graph is complete graph.*

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Theorem 3.3. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old complete graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. Then new graph is also complete graph and is old graph.*

Theorem 3.4. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old star graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. Then new graph is also complete graph.*

Theorem 3.5. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old wheel graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. Then new graph is also complete graph.*

Theorem 3.6. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old wheel graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. If $\delta = \Delta$, then new graph is old graph.*

Theorem 3.7. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old wheel graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. If $\delta = \Delta = \mathcal{O}(\mathcal{G}) - 1$, then new graph is old graph. And both are complete.*

Theorem 3.8. *Let $\mathcal{G} : (\mathcal{V}, \mathcal{E})$ be an old cycle graph and* **Δ-REGULAR** *is a new graph on $\mathcal{G}$. Then new graph is old graph. And both are cycle.*

Theorem 3.9. *Consider an old graph and its* **Δ-REGULAR**. *Then new graph's parameters are as follows:*

- *New Order=Old Order;*
- *Size=$\Delta \times$Order;*
- *Vertex-coloring number=Δ;*
- *Edge-coloring number=$\Delta - 1$;*
- *New domination number is $\leq$ old domination number;*
- *Clique number is Δ.*

4 Results And Its Beyond

Definition 4.1. Consider an old graph. The new graph on it is defined as follows and the same process to case (i):

- **Δ-REGULAR**
- **(vertex-coloring)-REGULAR**
- **(edge-coloring)-REGULAR**
- **(domination)-REGULAR**
- **(clique)-REGULAR**
- **δ-REGULAR**

Theorem 4.2. *Consider an old graph and its* **(domination)-REGULAR**. *If old graph is complete or star, then new graph is*

- *perfect matching*
- *with new $\Delta = \delta = 1$;*
- *it isn't connected graph and $\frac{n}{2}$ components of being connectedness;*
- *new number of edges is $\frac{n}{2}$.*

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Theorem 4.3. *Consider an old graph and its* **(vertex-coloring)-REGULAR**. *If old graph is complete or star, then new graph is*

- *complete;*
- *with new* $\Delta = \delta = n - 1$*;*
- *it's connected graph;*
- *new number of edges is* $\frac{n(n-1)}{2}$.

Theorem 4.4. *Consider an old graph and its* **(clique)-REGULAR**. *If old graph is complete or star, then new graph is*

- *complete;*
- *with new* $\Delta = \delta = n - 1$*;*
- *it's connected graph;*
- *new number of edges is* $\frac{n(n-1)}{2}$.

Theorem 4.5. *Consider an old graph and its* **(delta)-REGULAR** *and its* **(Delta)-REGULAR**. *If old graph is path, then new graph is*

- *cycle; if it's* Δ**-REGULAR**
- *perfect matching; if it's* δ**-REGULAR**
- *it isn't connected graph; if it's* δ**-REGULAR**
- *it is connected graph; if it's* Δ**-REGULAR**

Theorem 4.6. *Consider an old graph and its* **(delta)-REGULAR** *and its* **(Delta)-REGULAR**. *If old graph is cycle, the following statements are equivalent up to isomorphism in the matter of isomorphic graph:*

- *It's* Δ**-REGULAR**
- *It's* δ**-REGULAR**
- *It's cycle*
- *It's old graph*

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