

## ABSTRACT

### COUNTING THE NUMBER OF DISCONNECTED LABELLED GRAPH WITHOUT PARALLEL EDGES

By

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A graph  $G(V,E)$  is connected graph if there exists at least one path between every pair of vertices in  $G$ . Otherwise,  $G$  is disconnected. A graph  $G$  is called as a labelled graph if every vertices or every edges is labelled. In this research, we concerning about a graph where every vertex is labelled. Parallel edges are two edges or more whose the same end points. In a disconnected labelled graph without parallel edges, we can determine the formula for the number of disconnected labelled graphs without parallel edges if  $n$  vertices and  $m$  edges are given. In this research, we found that the formula for the number of disconnected labelled graphs without parallel edges if  $n=3,4$  and  $m \geq 1$ . For  $n=3$  and  $m \geq 1$ , the formula is  $G_{3,m} = \binom{2m+2}{2}$ ; for  $n=4$  and  $m=1$ , the formula is  $G_{4,1} = 10$ , and for  $n=4$  dan  $m > 1$ , the formula is  $G_{4,m} = \binom{3m+1}{3} - \binom{m+1}{3} + \binom{2m+2}{2}$ .

**Keywords:** *graph, disconnected graph, loop, parallel edges*