

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE CHROMATIC UNIQUENESS OF A FAMILY
OF 6-BRIDGE GRAPHS $\theta(3, 3, 3, 3, b, c)$

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	iv
LIST OF TABLES	v
ABSTRACT	vi
1 INTRODUCTION	1
1.1 INTRODUCTION	1
1.2 PROBLEM STATEMENT	3
1.3 OBJECTIVE OF STUDY	3
1.4 SIGNIFICANT OF STUDY	3
1.5 SCOPE OF STUDY	3
1.6 LITERATURE REVIEW	4
2 METHODOLOGY	10
3 IMPLEMENTATION	13
4 RESULTS AND DISCUSSION	16
5 CONCLUSIONS AND RECOMMENDATIONS	29
REFERENCES	31

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ABSTRACT

A chromatic polynomial is denoted as $P(G, \lambda)$ while for graph H is $P(H, \lambda)$. Both graph of G and H are equivalently chromatic can be written in the form of $P(G, \lambda) = P(H, \lambda)$. The chromatically unique of $H, G \sim H$ that implies the graph G is an isomorphic to graph H. The multigraph are also known as a multi edges graph. Two different vertices which connected with every edge will also connected with other edges. The multigraph with two vertices and k edges is denotes as θ_k . In addition, a multi-bridge graph or a k – *bridge* graph are also known as the subdivision of θ_k . In this study we continue to solve a new problem of chromaticity of 6-bridge graph, that is $\theta(3,3,3,3,b,c)$ and prove the chromatic uniqueness of a new family of 6-bridge graphs.

1 INTRODUCTION

1.1 INTRODUCTION

In 1735 Leonhard Euler for the first time had determined the graph theory when he is successfully solved the problem of The Seven Bridges of Konigsberg. In order to determine whether it is sufficient for the four colours to colour any maps so that neighbouring countries is differentiable by the four colours. This is called as the Four - Colour Problem. Francis Guthrie was the one who conjectured this problem in 1852 and then it was forwarded to De Morgan before. Next, Arthur Cayley had represented it to the London Mathematical Society in 1878. Birkhoff (1912) had also done this research to solve the problem of chromaticity and then introduced a new function called a chromatic polynomial of M , denoted by $P(M, \lambda)$. This function is defined as the number of proper λ -coloring of a map M using at most λ distinct colours. Tutte (1974), Birkhoff (1930), Whitney (1932) and Read (1968) have done tremendously studied on the chromatic polynomial with other researchers to investigate the main characteristics of chromatic polynomials.

There are a lot of studies that have been done by several researchers in order to solve the Four - Colour Problem. The problem is to determine the colour of maps so that the neighbouring countries can be differentiable. During the period of unsolved problem a new function called chromatic polynomial being introduced extraordinarily. In 1912, Birkhoff (1912) who also involve in this problem had come out with a defined function $P(M, \lambda)$ that gives the number of proper λ - colourings of a map . It is called the *chromatic polynomial* and denoted by $P(M, \lambda)$ when the polynomial is in λ . This would give positive result to the Four - Colour problem if $P(M, 4) > 0$ for all maps M could be prove. In 1932, Whitney had further the study of chromatic polynomials from maps to graphs then he settled many fundamental results for it.

Generally, based on graph theory an ordered pair of a graph G is denoted by $G(V, E)$ consisting a non-empty vertex set, denoted by $V(G)$ and edge set denoted by $E(G)$, where each