

CYCLE INDEX POLYNOMIAL, POLYA'S THEOREM AND IT'S APPLICATION TO ENUMERATE THE COLOUR PATTERN OF OCTAHEDRON

One of the problem involved in Group Theory is the enumeration problem. This problem can be solved by Polya's Theorem. Polya's theorem closely related to the cycle index polynomial of a group, because it used to count the number of patterns on permutations group that form the cycle index of groups. The Polya's Theorem consists of Polya's Theorem I and Polya's Theorem II. The aim of this observation is to find the number of patterns of coloured octahedron using the Polya's Theorem. The result show that the number of patterns of coloured points of octahedron for 1 to 6 colours are : 1, 10, 57, 240, 800 and 2.226 colour patterns. The number of patterns of coloured lines of octahedron for 1 to 12 colours are : 1, 218, 22.815, 703.760, 10.194.250, 90.775.566, 576.941.778, 2.863.870.080, 11.769.161.895, 41.669.295.250, 130.772.947.481, and 371.513.523.888 colour patterns, while the number of patterns of coloured sides of octahedron for 1 to 8 colours are : 1, 23, 333, 2.916, 16.725, 70.911, 241.913, and 701.968 colour patterns.

Keyword : Group Theory, Polya's Theorem, Cycle Index Polynomial.