Polinomial Karakteristik dan Nilai Eigen Beberapa Matriks Representasi dari Graf Prisma Berarah Siklik = Characteristic Polynomials dan Eigenvalues of Several Matrices of Directed Cyclic Prism Graph

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Abstrak

Graf prisma adalah graf yang bersesuaiandengan kerangkabangun ruangprisma. Hanya graf prismaberarahsiklik dengan pola tertentu yang diperhatikandalam penelitian ini. Graf prismaberarahsiklik dinotasikan 𝑌𝑚(𝑚≥3),di mana 𝑚adalah setengah jumlah simpul,dan memiliki 2𝑚 simpul dan3𝑚busur. Sebuah graf dapat direpresentasikanmenggunakansebuah matriks. Ada beberapa jenis matriks yang biasanya digunakan dalam merepresentasikan graf. Diantaranya adalah matriks adjacency, anti-adjacency, dan Laplacianyang dibahas dalam penelitian ini. Polinomial karakteristik dari matriks adjacency, matriks anti-adjacency, dan matriks Laplaciandari graf prisma berarah siklik 𝑌𝑚diperoleh beserta nilai-nilaieigen real dan kompleksnya. Metode yang digunakan untuk membuktikan hasil-hasil penelitian iniadalah operasi baris matriks dan faktorisasi. Adapununtukpolinomial karakteristik dari matriks anti-adjacency𝑌𝑚, hasilnya dibuktikan dengan mengamati subgraf terinduksi siklik dan asiklik dari 𝑌𝑚berdasarkan sebuah teorema yang ditemukan dalam penelitian sebelumnya.

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A prism graph is a graph which corresponds to the skeleton of a prism. Only directed cyclic prism graphs with certain pattern are considered in this research. The directed cyclic prism graph is denoted 𝑌𝑚(m≥3),where 𝑚is half the number of vertices,and has 2𝑚vertices and 3𝑚edges.Agraph can be represented by usinga matrix. There are several types of matrices that are usually used in representing a graph. Among them aretheadjacency, anti-adjacency, and Laplacianmatriceswhich are discussedinthis research. The characteristic polynomialsof theadjacency matrix,theanti-adjacency matrix, and the Laplacian matrix of directed cyclic prism graph 𝑌𝑚are obtainedas well as their real and complex eigenvalues. The methods used toprovethe results are matrix row operations and factorizations.As for the characteristic polynomial of the anti-adjacency matrix of 𝑌𝑚, the results are proved byobserving the both cyclic and acyclic induced subgraphs of 𝑌𝑚according to a theorem invented in a previous research