

# Clique Identification in Flight Route Problem

Irmeilyana<sup>1\*</sup>, Indrawati<sup>1</sup>, and Serly Angraini<sup>1</sup>

<sup>1</sup>Department of Mathematics, Faculty of Mathematics and Natural Sciences, Sriwijaya University, Inderalaya, South Sumatera Indonesia

\*Email Address: imel\_unsri@yahoo.co.id

## Abstract

Clique is a subset of directed graph that has at least three vertices. For each pair of vertices  $P_i$  and  $P_j$  in these subsets, both  $P_i \rightarrow P_j$  and  $P_j \rightarrow P_i$  is correct. Made of possible subsets; in the sense that it is not possible to add other vertices into subsets such. Clique can be determined by identifying the relationship between the airport and then know which city that can be traversed to go from one city to another. But they can also know which airports are busy or there is a large airport on each island in Indonesia. Clique identification was carried out on the flight route Sriwijaya Air and

*Clique* adalah sebuah subhimpunan dari sebuah graf berarah yang mempunyai paling sedikit tiga verteks. Untuk tiap pasangan verteks  $P_i$  dan  $P_j$  pada subhimpunan tersebut, baik  $P_i \rightarrow P_j$  maupun  $P_j \rightarrow P_i$  adalah benar. Subhimpunan dibuat sebesar mungkin; dalam pengertian bahwa tidak mungkin untuk menambah verteks lainnya kedalam subhimpunan tersebut. Dengan mengidentifikasi *clique* dapat diketahui hubungan antar bandara sehingga diketahui kota mana saja yang dapat dilalui untuk pergi dari satu kota ke kota lain. Selain itu juga dapat diketahui bandara-bandara mana saja yang sibuk atau bandara besar yang ada di setiap pulau di Indonesia. Identifikasi *clique* ini dilakukan pada rute penerbangan Sriwijaya Air dan Garuda Indonesia. Setiap *clique* hanya terdiri dari tiga kota, dan memuat Jakarta. Kota-kota yang membentuk *clique* adalah Banda Aceh, Medan, Batam, Pekanbaru, Palembang, Semarang, Surabaya, Banjarmasin, Balikpapan, Ujung Pandang, Gorontalo, Manado, Ambon, Kendari, Palu, Ternate, Denpasar, Kupang, Timika, Biak, dan Jayapura. Jumlah bandara yang membentuk clique pada penerbangan Sriwijaya Air lebih sedikit dibandingkan pada penerbangan Garuda Indonesia. Jumlah *clique* yang dapat dibentuk pada penerbangan Sriwijaya Air lebih banyak dibandingkan pada penerbangan Garuda Indonesia.

**Keywords:** Clique, rute penerbangan

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Irmeilyana received her S.Si (Undergraduate Degree in Science) in Mathematics from Bogor Agriculture Institute (IPB) Indonesia in 1997. Then she received her Master Degree in Mathematics from Bandung Technology Institute (ITB) Indonesia in 1999. In 2012, she tries to apply PhD Programme in Sriwijaya University, Indonesia. She has been a Mathematics Department member at Faculty Mathematics and Natural Sciences Sriwijaya University South Sumatera Indonesia. Her research interests include Statistics, optimization and its applications.

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Keywords: clique, flight routes