

INTISARI

ANALISIS SISTEM ANTREAN *DOUBLE ENDED* PENUMPANG DAN TAKSI DENGAN METODE GEOMETRIK MATRIKS

Oleh

Eliana Utomo

18/430341/PA/18854

Pada skripsi ini dibahas antrean penumpang dan taksi atau biasa disebut antrean *double ended*. Antrean penumpang dapat datang dan pergi meninggalkan pangkalan taksi yang disebut *matching*. Adanya keramaian pada pangkalan taksi membuat laju kedatangan penumpang dan taksi tidak selalu sama. *Random environment* membantu mengontrol proses kedatangan dan pelayanan sehingga ditambahkan pada sistem antrean tersebut. Laju kedatangan penumpang dan taksi masing-masing berdistribusi Poisson dan laju pelayanan berdistribusi eksponensial. Permasalahan sistem antrean tersebut dapat dimodelkan sebagai proses QBD (*Quasi Birth and Death*) nonhomogen yang selanjutnya dipartisi menjadi QBD homogen dengan matriks generatornya dinotasikan dengan \tilde{Q} . Selanjutnya akan ditunjukkan bahwa matriks transisi \tilde{Q} memenuhi sifat ergodik sehingga penyelesaiannya dapat menggunakan metode geometrik matriks. Menggunakan metode substitusi berurut maka diperoleh *rate* matriks R yang digunakan untuk mencari vektor stasioner π_0 . Lebih lanjut, akan dibahas faktor apa saja yang dapat mempengaruhi antrean penumpang dan taksi.

ABSTRACT

ANALYSIS OF *DOUBLE ENDED* PASSENGER AND TAXI QUEUE SYSTEM USING MATRIX GEOMETRIC METHOD

By

Eliana Utomo

18/430341/PA/18854

This bachelor thesis discusses two types of queues: passenger queues and taxi queues, also known as double-ended queues. The passenger queue involves the entry and departure of passengers at the taxi stand, which is referred to as matching. The presence of crowds at the taxi stand implies that the arrival rates of passengers and taxis are not constant. To address this, a random environment is introduced to regulate the arrival and service processes within the queue system. The arrival rates of passengers and taxis follow a Poisson distribution, while the service rates follow an exponential distribution. The problem of the queue system is modeled as a non-homogeneous Quasi Birth and Death (QBD) process, which is further divided into homogeneous QBDs. The generator matrix for this system is denoted as \tilde{Q} . The ergodic properties of the queuing system are then demonstrated and the solutions for this queueing system are obtained by applying matrix geometric method. Using the successive substitution method, the rate matrix R is obtained which is used to find the stationary vector π_0 . Finally, various factors that can influence the queues of passengers and taxis are discussed.