



**FACULTY OF INFORMATION TECHNOLOGY  
AND QUANTITATIVE SCIENCE**

# **GENERATION OF SELF SIMILAR NETWORK TRAFFIC USING DFGN ALGORITHM**

**THESIS PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT  
FOR ITT 560**

**BSc (Hons) DATA COMMUNICATION AND NETWORKING**

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## ABSTRACT

This thesis discusses the generation of network traffic using discrete Fractional Gaussian Noise (dFGN) algorithm. Since the traffic on a number of existing networks is bursty, much research focuses on how to capture the characteristics of traffic to reduce the impact of burstiness. Conventional traffic models do not represent the characteristics of burstiness well, but self-similar traffic models provide a closer approximation. Self-similar traffic models have two fundamental properties, long-range dependence and infinite variance, which have been found in a large number of measurement of real traffic. Self-similar traffic models also have been found to be more appropriate for the representation of bursty telecommunication traffic.

The main starting point for self-similar traffic generation is the production of fractional Brownian motion (FBM) or fractional Gaussian noise (FGN). Fractional Brownian motion or Fractional Gaussian Noise is not only of interest for generation of network traffic. Its properties have been investigated by researchers in theoretical physics, probability, statistics, hydrology, biology, and many others. As a result, the techniques that have been used to study this Gaussian process are quite diverse, and it may take some effort to study them. Undoubtedly, this also makes the field more interesting.

After generating FBM sample traces, a further transformation needs to be conducted with testing the result to produce the self-similar traffic. Testing is done using R/S statistic and Variance Time plot method. After analyzed the result from both tools, the accuracy is more to R/S statistic rather than Variance Time Plot. However, the test result from data 0.5 shows that VT plot is more accurate rather than R/S statistic because the result for VT plot is exactly 0.5.

As a conclusion, statistical analysis of the data collected tells us that the self-similarity is implementing in the dfgn algorithm.

## **DECLARATION**

I certify that this thesis and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledge in accordance with the standard referring practices of the discipline.

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