

ABSTRACT

Network Planning Based on the Gamma Distribution. (August 1969)

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The primary objective of this research is to develop a different method of analyzing network-based planning models. This method of analysis is activity oriented and incorporates the entire distribution of activity completion times into the analysis, not just the expected completion times.

The use of probability distributions, other than the currently used Beta, to describe the distribution of activity completion times is presented. Several methods of estimating the parameters of these various distributions are reviewed and discussed. Alternative criteria for the selection of critical paths are presented.

A method of network analysis called Analysis by Index (ABI) is developed. This procedure is based upon activity indexes and the necessary equations for this method are derived and computational approximations discussed. A step by step algorithm for this procedure is also presented and applied to a sample network. In addition to the conventional analysis of a network this method lends itself to different types of analyses not possible by other techniques. Several of these are presented and their solutions discussed in connection with a sample problem.

A computer program to perform the ABI analysis was also developed. Its limitations and overall performance are described and suggested computational refinements are presented. In addition, several test networks were analyzed using this program and their results are presented in the Appendix.