

The decision version of the forwarding index problem is, given a connected graph G and an integer ξ , to find a way of connecting each ordered pair of vertices by a path so that every vertex is an internal point of at most such paths. The optimization version of the problem is to find the smallest ξ for which a routing of this kind exists. Such a problem arises in the design of communication networks and distributed architectures. A model of parallel computation is represented by a network of processors, or machines processing and forwarding (synchronous) messages to each other, subject to physical constraints bearing on either the number of messages that can be processed by a single machine or the number of messages that can be sent through a connection. It was in this context that the problem was first introduced by Chung et al. (IEEE Trans. Inform. Theory 33 (1987) 224). The aim of this paper is to establish upper bounds for the optimal ξ as a function of the connectivity of the graph. © 2004 Published by Elsevier B.V