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# 光RP(k)网络上Hypercube通信模式的波长指派算法

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## Abstract

Routing and channel assignment is a key topic in optical interconnection networks, and it is a primary way to get insight into the capacity of interconnection networks. Based on the optical RP(k) network, the wavelength assignment of realizing the Hypercube communication with  $N=2n$  nodes on the optical RP(k) network is discussed. By defining the reverse order of the Hypercube, an algorithm to embed the  $n$ -D Hypercube into the RP(k) network is designed, which needs at most  $\max\{2, \lfloor 5(2n-5)/3 \rfloor\}$  wavelengths. An algorithm to embed the  $n$ -D hypercube into the ring network is also proposed, with its congestion equal to  $(N/3+N/12)$ . This is a better improvement than the known results, which is equal to  $(N/3+N/4)$ . The two algorithms proposed in this paper are of great value in designing optical networks.

Liu FA, Liu ZY, Qiao XZ. A wavelength assignment algorithm of hypercube communication on optical RP(k) networks. *Journal of Software*, 2003,14(3):575~581.

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## 摘要

波长指派是光网络设计的基本问题, 设计波长指派算法是洞察光网络通信能力的基本方法. 基于光RP(k)网络, 讨论了其波长指派问题. 含有 $N=2n$ 个节点的Hypercube通信模式, 构造了节点间的一种排列次序 $X_n$ , 并设计了RP(k)网络上的波长指派算法. 在构造该算法的过程中, 得到了在环网络上实现 $n$ 维Hypercube通信模式的波长指派算法. 这两个算法具有较高的嵌入效率. 在RP(k)网络上, 实现Hypercube通信模式需要 $\max\{2, \lfloor 5(2n-5)/3 \rfloor\}$ 个波长. 而在环网络上, 实现该通信模式需要复用 $(N/3+N/12)$ 个波长, 比已有算法需要复用 $(N/3+N/4)$ 个波长有较大的改进. 这两个算法对于光网络的设计具有较大的指导价值.

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