

A Novel Direct Small World Network Model

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Abstract: There is too much redundancy and low efficiency on modern computer networks. This paper presents a novel Direct Small World network model in order to optimize networks. In this model, several nodes construct to regular networks. Then, replot some nodes randomly and iteratively to generate Direct Small World network. There are no change in average distance and clustering coefficient, however, the network performance improved, such as hops. The experiments prove that compared to traditional small world network, the degree, average of degree centrality and average of closeness centrality are lower in Direct Small World network. This illustrates that the nodes in Direct Small World networks are closer than Watts–Strogatz small world network model. The Direct Small World can be used not only in the communication of the community information, but also in the research of epidemics.

Keywords: Small World network; complex networks; node centrality; network reliability; network optimization