十一、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

（二）計畫英文摘要。（五百字以內）

The attempt to interconnect hundreds or more processing elements in computers is of use to solve numerous real-world problems, so that the interconnection network is mostly a critical factor affecting the system performance. In particular, network embedding is of great importance because the portability between the guest and host networks would permit executing the guest specified algorithms on the host with as little modification as possible. Since linear arrays and rings are two of the most fundamental structures for parallel and distributed computation, this project is aimed to explore the efficient methods of cycle and path embedding (Aim 1), and to address two topological properties and their variations related to path embedding in interconnection networks: one is panconnectedness (Aim 2) and the other is Hamiltonicity (Aim 3).

Aim 1: Efficient Cycle and Path Embedding in Interconnection networks

The problem of embedding cycles or paths of the given length into interconnection networks corresponds to the concept of pancyclicity or panconnectedness, respectively. A network G is called pancyclic if it contains a cycle of length l for each integer l from 3 to $|V(G)|$ inclusive, where $V(G)$ denotes the vertex set of G. A network G is said to be panconnected if, for any two distinct vertices x and y, it has an $[x,y]$-path of length l for each $d_G(x,y) \leq l \leq |V(G)|-1$, where $d_G(x,y)$ denotes the distance between x and y in G. In practice, because the network components may have no function accidentally, it is greatly demanded to take the fault-tolerance related issues into account. In this proposal the fault-tolerant panconnectedness will be addressed.

Aim 2: On the Variations of Panconnectedness

As our extension of the original panconnectedness property, two possible variations are considered in this study. One is called panpositionable panconnectedness (Aim 2.1), and the other is called two-disjoint-path panconnectedness (Aim 2.2). Then many other topological properties of interconnection networks follow immediately.

Aim 3: On the Variation of Hamiltonicity

The problem of finding a Hamiltonian cycle in a graph is well known to be NP-complete, and thus has been widely discussed. In this proposal we address the concept of mutually independent Hamiltonian cycles, which is related to the number of Hamiltonian cycles in a given graph. In particular, this concept will be concerned with respect to some classes of interconnection networks.

Keywords: Interconnection network, Graph, Panconnected, Hamiltonian, Cycle, Path.