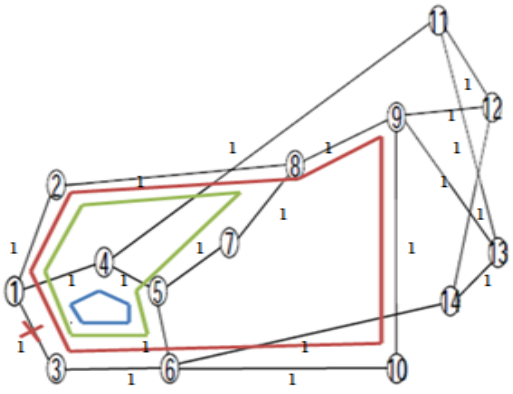
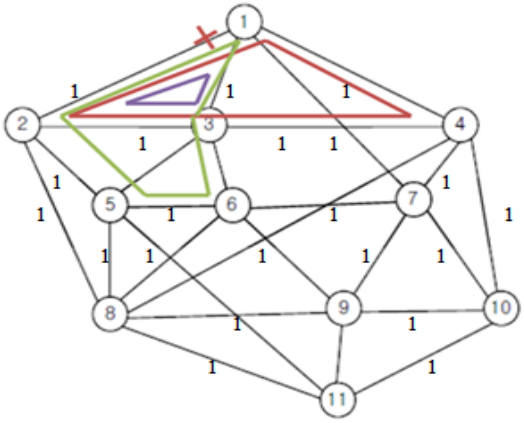
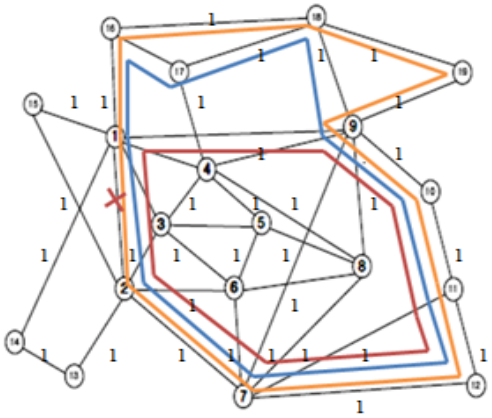


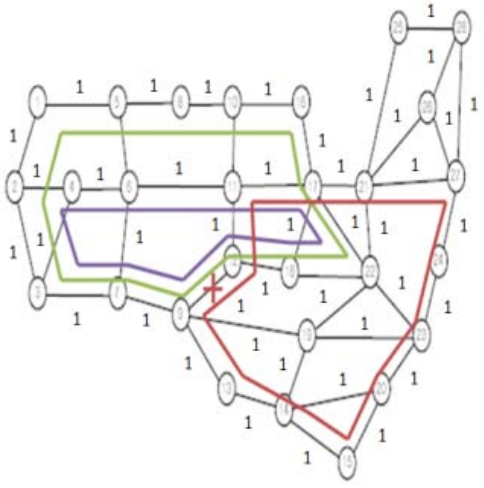
(a) NFSNetNetwork (N=14,S=21)



(b)COST239Network (N=11,S=26)



(c) EON Network(N=19, S=38)



(d)USANetwork(N=28, S=45)

Figure 4: The four test Networks used

6. Numerical Results

Number of fundamental cycles and Redundancy of NSFNet,COST239,EON network and USA networks are given in below table.Fundamental cycles are determined based on BFS and DFS methods.

Redundancy of test network is the ratio of the spare capacity of the cycle to the working capacity protected by the cycle.

The redundancy (*R*) is expressed as

$$R = \frac{\sum_{i \epsilon s} Pi}{\sum_{i \epsilon s} Wi}$$

Where *Wi* is the number of units of working capacity on span *i* and*piis* the corresponding number of spare capacity units on span *i*.

Table 1 Four test networks information

Network	*NSF Net*	*COST239*	*EON NETWORK*	*USA NETWORK*
No. of nodes	14	11	19	28
No.of spans	21	26	38	45
Fundamental cycles	7	42	44	46
Redundancy	76.%	32%	63.14%	73.3%

7. Performance Evolution

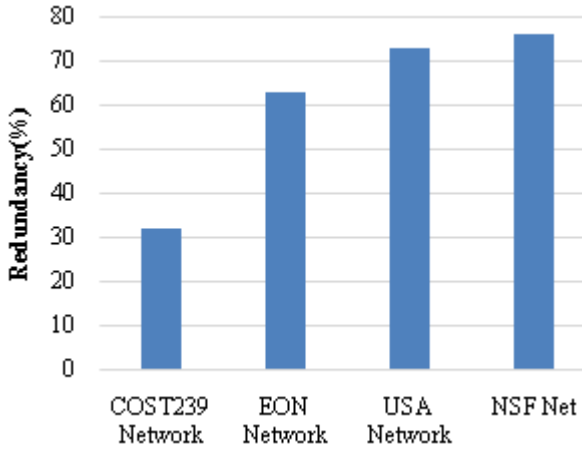


Figure 5: Shows the redundancy Vs different test networks

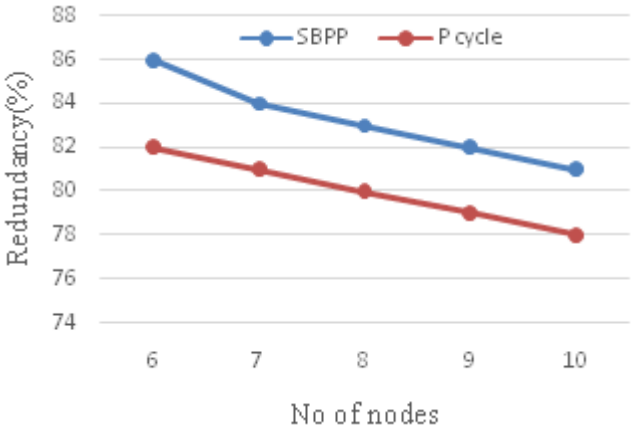


Figure 6: No. of nodes Vs Redundancy

In above graph, we observe comparison of two protection schemes i.e Shared backup path and P-cycle based on redundancy.SBPP having more redundancy and P-cycle having less redundancy than that of SBPP. With the reduction of redundancy total spare capacity reduced.

NSFNet

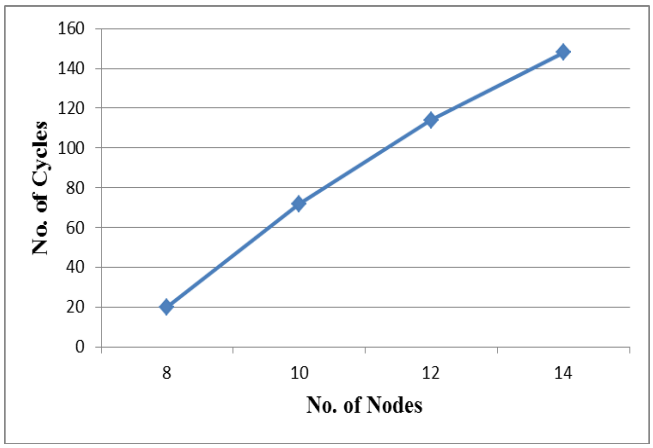


Figure 7: Number of p-cycles Vs Number of nodes

In any network number of cycles depends on the number of nodes if number of nodes increases then number of cycles also increased automatically.

8. Conclusion and Future Scope

The most promising approach is the pre-configured protection cycle (*p*-cycle) approach, which can offer the computation speed of ring networks and the capacity efficiency of mesh networks. We developed a new p-cycle based protection method for dynamic traffic in WDM network. We first find an optimal solution for *p*-cycle designs, the initial step requires formation of fundamental cycles by Breadth First Search (BFS) and Depth first Search (DFS) and then candidate P-Cycles are generated by using Join algorithm and best cycle is selected based on redundancy. Four different test networks redundancies are obtained based on spare capacity and working capacities of that network with unity weights. By using p-cycles to cover a network and reserving capacity on the links that are on p-cycles, the design can achieve maximum protection against single link failure for dynamic traffic. It can be concluded that the proposed p-cycle based design for dynamic traffic can achieve fast restoration while having comparable capacity efficiency as Shared Backup Path Protection.

This paper explains*p*-cycle design has been limited to static traffic. It aims to balance between fast restoration time and high capacity efficiency However, survivability in dynamic networks is more complex and it will be hard to achieve this objective. This is because the traffic demands arrive randomly and we do not have concise information on the traffic pattern. This can lead to high blocking probability and reduce the protection against network failure. Thus, dynamic traffic in real network is an important field of study for the design of survivable networks.

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