

## SYNOPSIS

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**Project Title:** HYPERGRAPH-BASED SPECTRUM SENSING AND ANALYSING

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### Abstract:

The integration of space and terrestrial communications is becoming increasingly important as the demand for reliable and high-speed communication continues to grow. However, managing the allocation of resources for such communication networks can be challenging, particularly when multiple conflicting requirements and constraints exist. This paper proposes a graph-based resource allocation approach to address this challenge. The approach considers both space and terrestrial communications and allocates resources such as bandwidth and power in a coordinated manner. The proposed method models the communication network as a graph, with nodes representing communication devices and links representing communication channels. The resource allocation problem is formulated as an optimization problem, with the objective of maximizing the overall network performance while satisfying the various constraints, such as capacity limitations, power consumption limits, and quality-of-service requirements. The optimization problem is then solved using a graph-based algorithm that leverages the inherent structure of the communication network. The proposed approach has been evaluated using simulation experiments, which show that it can effectively allocate resources for integrated space and terrestrial communications. The results demonstrate that the proposed method outperforms existing resource allocation approaches in terms of network performance, such as throughput and network efficiency. In conclusion, this paper presents a novel graph-based resource allocation approach for integrated space and terrestrial communications. The approach takes into account the interdependence between space and terrestrial communications and allocates resources in a coordinated manner, leading to improved network performance. The proposed method provides a promising solution to the resource allocation problem in integrated communication networks and has the potential to be applied in practical communication systems

**Specific Contribution:** Conduct simulation experiments, Implement the graph-based algorithm

**Specific Learning:** MATLAB coding and stimulations

**Technical Limitations & Ethical Challenges faced:** Understanding the attributes present in the data

**Keywords:** HYPERGRAPH, TERRESTRIAL COMMUNICATION, SPECTRUM SENSING

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