

In a social network, a researcher observes that people's friends tend to have more friends than they do. This observation is most likely explained by:

When analyzing the robustness of a network with degree distribution $P(k) \sim k^{-\gamma}$ where $2 < \gamma < 3$, what happens to the critical fraction f_c of nodes that need to be removed as the network size N increases?

A researcher is analyzing a directed network and finds that nodes form two distinct groups where nodes in one group primarily link to nodes in the other group, with few connections within groups. This structure is best described as:

When implementing DeepWalk for network embedding, what is the key reason for using random walks rather than directly processing the network structure?

In a Graph Convolutional Network (GCN), why is the normalization term $D^{-1/2}AD^{-1/2}$ important?

Given a network with communities, the modularity value Q is 0.2.
What does this indicate?

A minimum spanning tree of a network with N nodes contains:

In a random walk on an undirected network, what determines the stationary distribution probability π_i for node i ?

The resolution limit in modularity maximization means that:

In the context of graph neural networks, what is the key advantage of the Graph Attention Network (GAT) over standard Graph Convolutional Networks?

In a network, the eigenvector centrality of a node is close to zero.
What does this most likely indicate?

When implementing `node2vec`, what is the primary purpose of the parameters p and q ?

The Katz centrality addresses a limitation of eigenvector centrality by:

In the Euler path problem, if a graph has exactly two nodes with odd degree, what can we conclude?

In the stochastic block model, setting $p_{\text{in}} < p_{\text{out}}$ creates:

The ChebNet architecture in graph neural networks is motivated by:

A network has a high clustering coefficient but a relatively small average path length. This most likely indicates:

What distinguishes GraphSAGE from traditional GCNs in terms of scalability?

The Graph Isomorphism Network (GIN) is designed to be as powerful as:

In the friendship paradox, when sampling a friend uniformly at random from all friendships (edges), the probability of selecting a person with degree k is proportional to:

When applying Kruskal's algorithm to find a minimum spanning tree, what is the key difference from Prim's algorithm?

In the context of spectral graph convolution, what's the primary reason for using Chebyshev polynomials?

The HITS algorithm assigns two scores to each node because:

In graph attention networks (GAT), the attention weights α_{ij} must sum to 1 over j because:

For connected networks, the second smallest eigenvalue of the normalized Laplacian matrix is related to:

When calculating modularity, what is the primary purpose of the null model term $(k_i k_j / 2m)$?

In the karate club network, if we apply a low-pass filter to node features, what effect would we expect?

The success of node2vec compared to DeepWalk can be primarily attributed to:

In Graph Isomorphism Networks (GIN), why is it important that the aggregation function is injective?

The stationary distribution of a random walk on an undirected network is proportional to node degrees. This is mathematically expressed as:

What is the fundamental limitation of using adjacency matrix eigendecomposition for network embedding?

In a network where pagerank values are highly skewed (few nodes have very high values), what can we conclude about the parameter β ?

The key innovation of Graph Attention Networks (GAT) over standard GCNs is:

When implementing spectral graph convolution, what is the main advantage of using Chebyshev polynomials over direct eigendecomposition?