Decompositions.GraphDecomp.BollaLaplacian

Table of Contents

Returns the adjacency matrix and laplacian matrix of a graph corresponding to the decomposition of the input hypergraph according to Mariana Bolla.

Syntax

[adjMat, lapMat] = BollaLaplacian(HG);

Input

HG - hypergraph object with incidence matrix property obj.IM

Output

- adjMat - adjacency matrix of the decomposed hypergraph
- lapMat - graph Laplacian matrix of the decomposed hypergraph

Disclaimer

The definition of Bolla's Laplacian from a hypergraph was taken from the below paper.

Bolla, M. (1993). Spectra, euclidean representations and clusterings of hypergraphs. Discrete Mathematics, 117.

```
function [adjMat,lapMat] = BollaLaplacian(HG)
%BOLALAPLACIAN Summary of this function goes here
%   Detailed explanation goes here
H = HG.IM;
de=sum(H,1)';
H=H(:,de>1); % remove edges which represent self loops or empty
de=sum(H,1)';

Deinv=sparse(1:length(de),1:length(de),1./de,length(de),length(de)); %diag(1./
de)
adjMat=H*Deinv*H';
dv=sum(H,2); %this should be same as sum(adjMat,2)
Dv=sparse(1:length(dv),1:length(dv),dv,length(dv),length(dv));
lapMat=Dv-adjMat;
end
```

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