Decompositions.GraphDecomp.RodriguezLaplacian

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Returns the adjacency matrix and laplacian matrix of a graph corresponding to the decomposition of the input hypergraph according to J.A. Rodriguez.

Syntax

[adjMat, lapMat] = RodriguezLaplacian(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 Rodriguez's Laplacian from a hypergraph was taken from the below paper.

Rodriguez, J. A. (2003). On the Laplacian spectrum and walk-regular hypergraphs. Linear and Multilinear Algebra, 51, 285–297.%% Code

```
function [adjMat,lapMat] = RodriguezLaplacian(HG)
%RODRIGUEZLAPLACIAN 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

adjMat=H*1*H';
adjMat=adjMat-diag(diag(adjMat));
Dvr=diag(sum(adjMat,2));
lapMat=Dvr-adjMat;
end
```

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