Computations.averageDistance

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Computes the mean pair-wise path distance between nodes in the hypergraph.

Syntax

```
d = averageDistance(HG)
[d, dmax] = averageDistance(HG)
```

Input

- HG - Hypergraph object. HG must represent a k-uniform hypergraph.

Output

- d - Average distance between two nodes in the hypergraph.
- dmax - Maximum distance between two nodes in the hypergraph.

Disclaimer

The formula for average distance was obtained from equation 30 of the paper below.

Amit Surana, Can Chen, and Indika Rajapakse. "Hypergraph dissimilarity measures." arXiv preprint arXiv:2106.08206 (2021).

Code

```
function [d, dmax] = averageDistance(HG)
import Decompositions.TensorDecomp.uniformEdgeSet
A = uniformEdgeSet(HG);
n = size(A,2);

s = [];
t = [];

for i = 1:size(A, 1)
    a = A(i, :);
    k = 1;
    for j = 1:length(a)
```

```
        s = [s a(j)*ones(1, length(a)-k)];
        t = [t a(j+1:end)];
        k = k + 1;
    end
end

G = graph(s, t);
D = distances(G);

dmax=max(D(:));
d = sum(D, 'all')/2;
d = d/(n*(n-1)/2);

end
```

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