hypergraphs

A GAP package to work with hypergraphs

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Contents

1 Hypergraph Objects **4**
1.1 Hypergraph 4

2 Basic Constructions **5**
2.1 Hypergraphs 5
2.2 Properties 5
2.3 Parameters 6

3 Library of Hypergraphs **7**
3.1 Hypergraphs 7

Index **8**

Chapter 1

Hypergraph Objects

1.1 Hypergraph

Chapter 2

Basic Constructions

2.1 Hypergraphs

2.1.1 HHypergraph

▷ `HHypergraph(V, Ed)` (method)

Returns the hypergraph object, with vertices `V` and hyperedges `Ed`.

2.1.2 HCompleteHypergraph

▷ `HCompleteHypergraph(n, r)` (function)

Returns the hypergraph that has $\{1 \dots n\}$ as set of vertices, and all r-subsets of $\{1 \dots n\}$ as hyperedges.

2.1.3 HRandomUniformHypergraph

▷ `HRandomUniformHypergraph(n, r, p)` (function)

Returns a hypergraph with set of vertices given by $\{1 \dots n\}$, and where each r-subset of $\{1 \dots n\}$ appears as a hyperedge with probability p.

2.1.4 HRemovedEdge

▷ `HRemovedEdge(H, e)` (function)

Returns the graph obtained from the hypergraph `H` removing its edge `e`.

2.2 Properties

2.2.1 IsUniform

▷ `IsUniform(H)` (method)

Determines if the hypergraph H is uniform, that is, if all edges of H have the same cardinality k. If H is uniform, then the function returns k, otherwise, it returns false.

2.2.2 IsSimple

▷ `IsSimple(H)` (method)

Determines whether the hypergraph H is simple. (A hypergraph is simple if no edge is contained in another edge.)

2.3 Parameters

2.3.1 HNeighborhood

▷ `HNeighborhood(H, x)` (function)

Given a hypergraph H and one of its vertices x, returns the set of vertices that share an edge with x.

2.3.2 HDistancesFrom

▷ `HDistancesFrom(H, x)` (function)

Given a hypergraph H and one of its vertices x, it returns a record L, where $L.u$ is equal to the distance in H from the vertex x to the vertex u.

2.3.3 HDistance

▷ `HDistance(H, x, y)` (function)

Given a hypergraph H and two of its vertices x, y, this function returns the distance in H from x to y.

2.3.4 Diameter

▷ `Diameter(H)` (method)

Returns the diameter of the hypergraph H.

2.3.5 Girth

▷ `Girth(H)` (method)

Returns the girth of the hypergraph H.

Chapter 3

Library of Hypergraphs

3.1 Hypergraphs

3.1.1 HFano

▷ `HFano` (global variable)

The Fano hypergraph.

3.1.2 HQuad

▷ `HQuad` (global variable)

The hypergraph of the smallest generalized quadrangle.

Index

Diameter, 6

Girth, 6

HCompleteHypergraph, 5
HDistance, 6
HDistancesFrom, 6
HFano, 7
HHypergraph, 5
HNeighborhood, 6
HQuad, 7
HRandomUniformHypergraph, 5
HRemovedEdge, 5

IsSimple, 6
IsUniform, 5