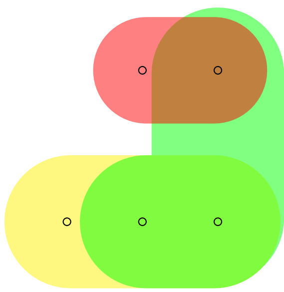
Notes

9 février, 2015

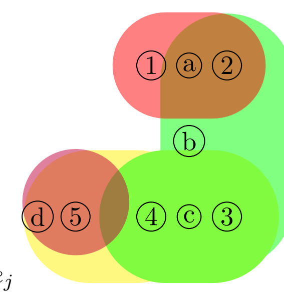
hypergraph H is a set V called the vertex set together with nonempty subsets of V called edges.

example

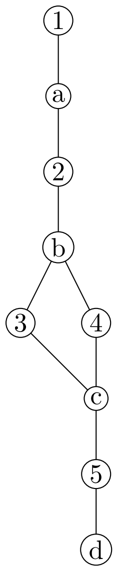
1. every graph is a hypergraph. in a graph all edges are size 2.
2. $H : V = \{1, 2, 3, 4\}, E = \{\{1, 2, 4\}, \{2, 3, 4\}, \{3, 4, 5\}\}$
3. 

if each edge has the same size then they are called k**-uniform**. degree still makes sense,as does multi vs simple

we can associate a bipartite graph to any hypergraph



the bipartite graph of H has partites V and E. it has edges from v_i to e_j if $v_i \in e_j$

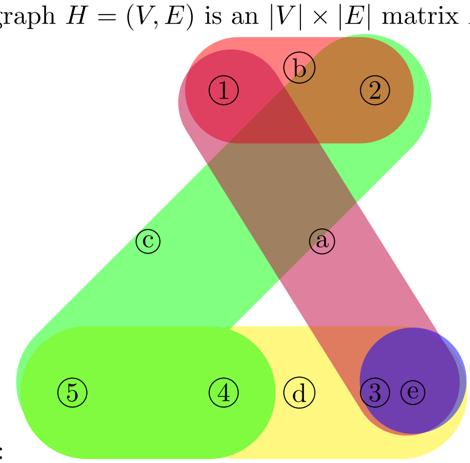


question

can we construct a hypergraph out of a bipartite graph? no in general.
restriction: cannot have an isolated vertex on the edge side of hypergraph.
{hpergraphs} $\leftrightarrow$ {hypergraphs w/ no isolated right side vertices}

adjacency matrices

they still exist
a hypergraph $H = (V, E)$ is an $|V| \times |E|$ matrix $A(H)$ such that $a_{ij} = 1$ if $v_i \in e_j$ or else $a_{ij} = 0$



example:
the transpose of $A(h)$ has another hypergraph associated to it called the dual of H. Denoted H^*. note $H^{**} = H$.

question:

how do hypergraph adjacency matrices compare to "regular" adjacency matrices?
hypergraph: no symmetry, $A^T(H) \neq A(H)$ and $H^* \neq H$
graph: $A^T(G) = A(G)$, $G^* = G$
it turns out that the matrices are *very* different.