

Exercises for Statistical analysis of network data-Sheet 11

1. Refer to Figure 1 for this question, and address the exercise for each of the three hypergraphs (a-c).
 - (a) Find the order and number of edges in the hypergraphs (a-c) in Figure 1.
 - (b) Find the included edges (if any).
 - (c) Find the multiple edges (if any).
 - (d) Is the hypergraph simple?
 - (e) For each pair of vertices labelling them if necessary, determine if they are adjacent.
 - (f) For each vertex determine the degree and the vertex neighbourhood.
 - (g) For each edge find the size.
 - (h) Find the maximum degree of each of the three hypergraphs.
 - (i) Are the hypergraphs regular?
 - (j) Are the hypergraphs uniform?
 - (k) Determine the rank of the hypergraphs.
 - (l) Find isolated (no edges) and pendant (only one edge connecting to another node) nodes. If such can be found.
 - (m) Find any singleton or empty edges.
 - (n) For subplot (c) name the vertices and edges, re-draw the hypergraph, and show an isomorphism to a different labelling.
 - (o) For subplot (c) calculate its incidence matrix, and determine its dual. Draw its dual.

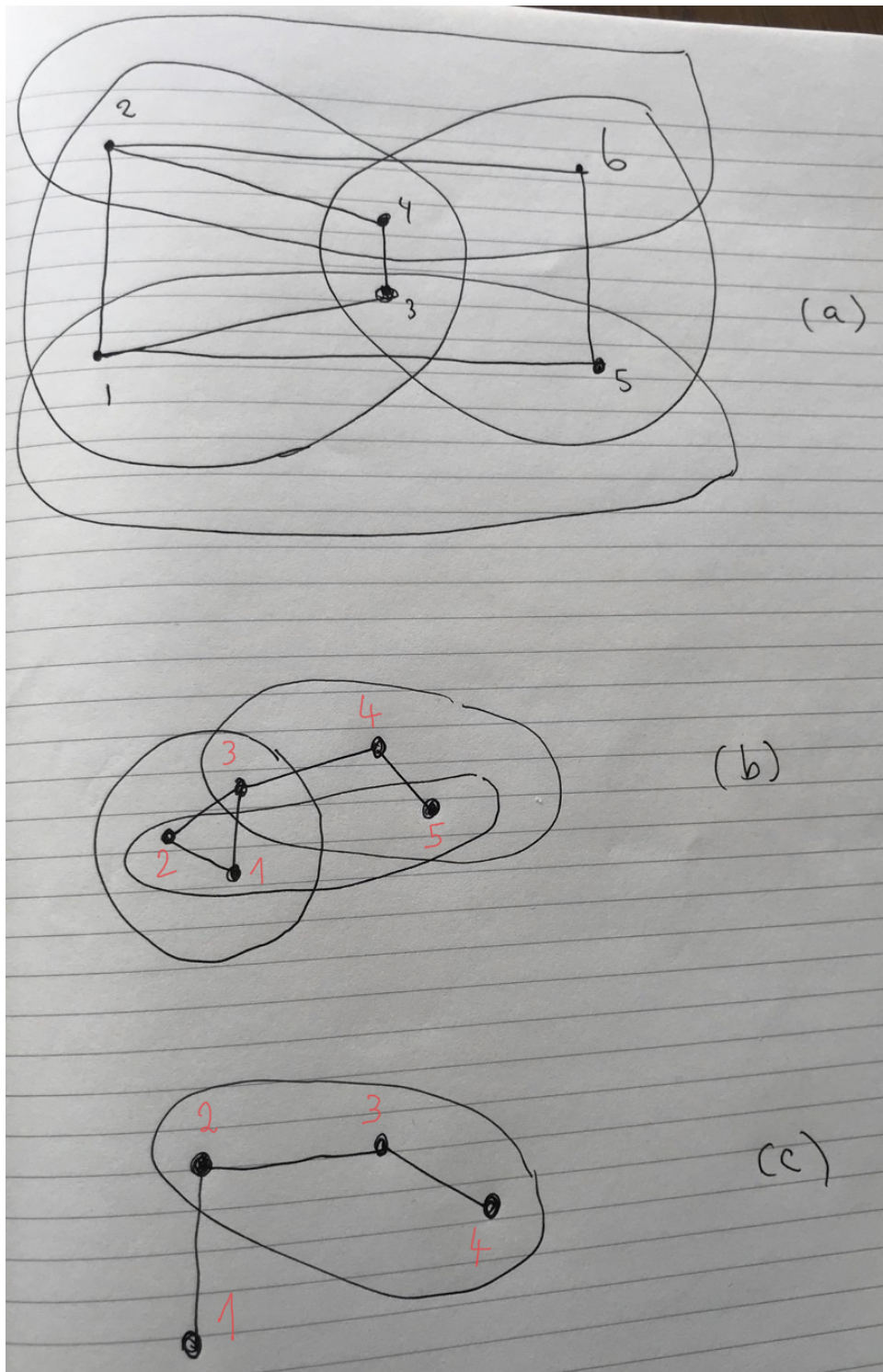


Figure 1: Three hypergraphs labelled from (a) to (c).