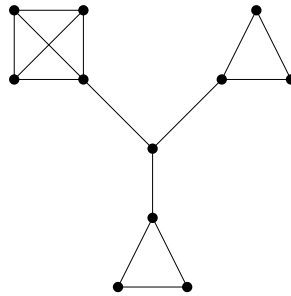


9 Machine Learning and Real-world Data (AAC)

This question concerns undirected graphs which consist of three fully interconnected regions each connected via a single link to a central node. Each fully interconnected region has at least three nodes. See the figure below for an example where the regions are of size 3, 3 and 4.



- (a) What is the diameter of such a graph? Justify your answer. [1 mark]
- (b) Which edges are local bridges? [2 marks]
- (c) What is the betweenness centrality of the central node? Explain your answer. [6 marks]
- (d) What clusters result if you successively break links in the order given by their edge betweenness centrality (i.e., according to the Newman-Girvan method)? [6 marks]
- (e) Give an example of a real world situation which might correspond to such a graph. Be explicit about the nature of the nodes and links. Is the clustering result intuitively reasonable for this situation? [5 marks]