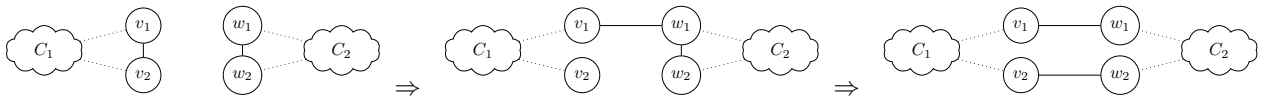
Problem 5

Theorem 1.1. *Let G be a nonempty graph with minimum degree at least two. Then, there is a connected graph G' having the same degree sequence as G.*

Proof. We will show that we are able to inter-connect any two connected components of G without changing the graph's degree-sequence.

For any component $C_1 = (V_1, E_1)$ and any vertex $v_1 \in V_1$, we find at least two more vertices $v_2, v_3 \in V_1$ within C_1 which are adjacent to v_1. From these considerations, removing any edge will have no impact on the connectivity of some component of G.

□



(a) Initial situation (b) (c) Result

Problem 6

Problem 7

For a set $C = \{G_1, ..., G_n\}$ of connected components:

$$\pi(C) = \sum_{i=1}^{n} \frac{|\{v \in V(G_i) \mid d(v) \text{ odd}\}|}{2} \tag{1}$$

Problem 8