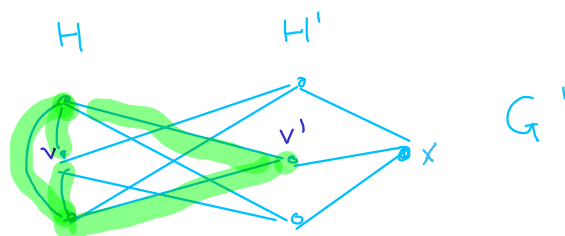


On Mycielski's construction and clique:



$$G = \emptyset$$

$$G' = \{x\}$$

$$G = \text{graph with 1 vertex}$$

$$G' = \text{graph with 2 vertices}$$

Proposition

If G is triangle-free, then G' (constructed from G using Mycielski's construction) is triangle-free.

Proposition

If G has chromatic number k , then G' has chromatic number $k+1$.

Mycielski's graphs

The n -th Mycielski's graph is a triangle-free graph with chromatic number n constructed in the following way:

- M_2 is the edge
- M_{n+1} is obtained as M_n'



Let G be a graph with clique and chromatic number k . How can I build from G a graph with clique number k and chromatic number $k+1$?

Solution: If k is not 0 nor 1, one can use G' , the graph constructed using Mycielski's construction. (If $k=0$ or $k=1$, this is not possible). Notice that adding a vertex and linking it to all the vertices in the clique does not work, since the clique number cannot increase.