Introduction to Modal Logic
Exercise class 2

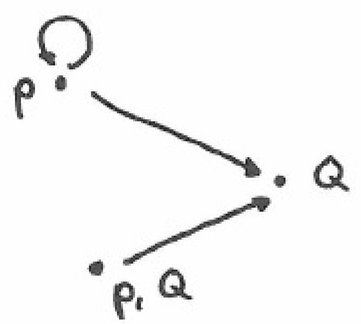
September 22, 2016

(1) Let $\Theta = \{p\}$ be the set of propositional variables and $\mathcal{M}_1 = (W_1, R_a, R_b, V)$ such that:

- $W_1 = \{w_i : i \in \mathbb{N}\} \cup \{v_i : i \in \mathbb{N}\}$
- $R_a = \{(w_i, v_i) : i \in \mathbb{N}\}$
- $R_b = \{(v_i, w_{i+1}) : i \in \mathbb{N}\}$
- $V(p) = W_1$

Construct a finite model $\mathcal{M}_2$ such that is point bisimilar to $\mathcal{M}_1$.

(2) Look at the following model:



- Compute the smallest and largest filtration for (a) $\Sigma = \{p, q\}$, (b) $\Sigma = \{p, q, \Diamond p\}$, (c) $\Sigma = \{q\}$
- Can you find a set of formulas Σ so that the largest and smallest filtration on $\mathfrak{M}$ through Σ coincide?

(3) Show that if φ is satisfied on some reflexive model then φ is satisfied on a finite reflexive model.

(4) Is every filtration of a symmetric model symmetric?