1 Problem Set 2 (for October 20)

- Show that Transitivity (of $\succcurlyeq_S$) implies

$$\begin{array}{l} \text{if } f \sim_S g \text{ and } g \sim_S h \text{ then } g \sim_S h \\ \text{if } f \succ_S g \text{ and } g \succcurlyeq_S h \text{ then } g \succ_S h \end{array}$$

- Consider the proof of the Expected Utility Maximisation Theorem. Prove the following equality used:

$$\frac{1}{n}\sum_{t\in\Omega}\sum_{x\in X} f(x|t)\big(u(x,t)\,[p(t|S)a_1 + (1-p(t|S))a_0] + (1-u(x,t))a_0\big) =$$

$$= \frac{1}{n}\sum_{t\in\Omega}\sum_{x\in X} f(x|t)u(x,t)p(t|S)a_1 + \left(1 - \frac{1}{n}(\sum_{t\in\Omega}\sum_{x\in X} f(x|t)u(x,t)p(t|S))\right) a_0$$

(∗)

- Consider the proof of the Expected Utility Maximisation Theorem. Prove the reveresed direction, i.e., given a utility function u, a conditional-probability function p fulfilling the assertions of the theorem, show that the thus defined relation $\succcurlyeq_S$ fulfils all axioms. (∗)

- A decision-maker expresses the following preference order:

$$[€600] \succ [€400] \succ .9[€600] + .1[€0] \succ .2[€600] + 0.8[€0] \succ .25[€400] + .75[€0] \succ [€0]$$

  Prove or disprove: These preferences are consistent with a state-independent utility of money. (∗)