EXERCISE Experiment.1. Consider Figure 4.1.1 (TO upwards; do not consider the other figures). Assume that both candidates have a nonzero probability of winning. Show that, under EU (with $\alpha^0 = 10$, p_1 for the (subjective) probability of $cand_1$ winning, and $p_2 = 1 - p_1$):

$$U(\alpha^4) - U(\alpha^3) = U(\alpha^3) - U(\alpha^2) = U(\alpha^2) - U(\alpha^1) = U(\alpha^1) - U(\alpha^0) \ . \qquad \text{(E.1)}$$

First derive the last equality using only Figs. 4.1.1a and b. □

EXERCISE Experiment.2. Assume EU for Figures 4.1.1 and 4.1.2, with nonzero probabilities of winning for both candidates.

a) Show that $U(\beta^4) - U(\beta^3) = U(\beta^3) - U(\beta^2) = U(\beta^2) - U(\alpha^1) = U(\alpha^1) - U(\alpha^0)$.

b) Show that $\beta^j = \alpha^j$ for all j. □

EXERCISE Experiment.3. Assume EU for Figures 4.1.1 and 4.1.3, with nonzero probabilities of winning for both candidates. Show that $\gamma^j = \alpha^j$ for all j. □

EXERCISE Experiment.4. Do not assume EU (deviating from the title of this section). Assume only weak ordering of your preference relation. Further assume *strong monotonicity*, which means that any prospect becomes strictly better as soon as one of its outcomes is strictly improved. Under EU, not assumed here, the latter assumption would amount to all outcome events being nonnull. Show that $\delta^j = \alpha^j$ for all j in Figures 4.1.1 and 4.1.4. □

EXERCISE Experiment.5. Assume EU for Figure 4.1.5. Throughout we normalize $U(\alpha^0) = 0$ and $U(\alpha^4) = 1$. Assume the data of Figure 4.1.1, and the implications of EU there. Do not consider your own answers PE^j in Figure 4.1.5. Instead, consider the answers PE^j that EU predicts given $U(\alpha^j) = j/4$ for all j. Show that EU predicts $PE^j = j/4$ for all j. In other words, your answers in Figures 4.1.1 and 4.1.5 violate EU unless $PE^j = j/4$ for all j. □