Zimmermann and Sternefeld (2013) *IntoSem*
Chapter 7: Propositions

Exercises

Exercise 1: From Venn Diagrams to Sentences

Assume that (1)–(4) express the propositions depicted by the circles labeled $[\![\mathrm{S}_1]\!]$–$[\![\mathrm{S}_4]\!]$ in Fig. 1, respectively.

(1) Italy has lower debt than Spain.

(2) Italy has higher debt than Spain.

(3) Italy has lower unemployment than Spain.

(4) Italy has higher unemployment than Spain.

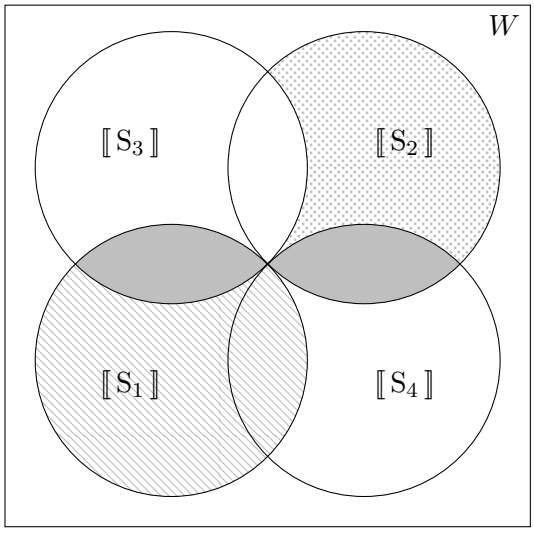

Fig. 1

Express the propositions whose regions are variously patterned in the figure, by means of operators like *and* or *but*, ((*n*)*either* . . .) (*n*)*or* and *not*.

Exercise 2: From Sentences to Venn Diagrams

Let the circle labeled $[\![\mathrm{S}_5]\!]$ in Fig. 2 depict the proposition expressed by (5):

(5) The average woman earns less than the average man.

Supplement Fig. 2 with a circle depicting the proposition expressed by (6), labeling it $[\![\mathrm{S}_6]\!]$, and mark the region of the proposition expressed by (7):

(6) The average woman earns much less than the average man.

(7) The average woman earns less, but not much less,
than the average man.

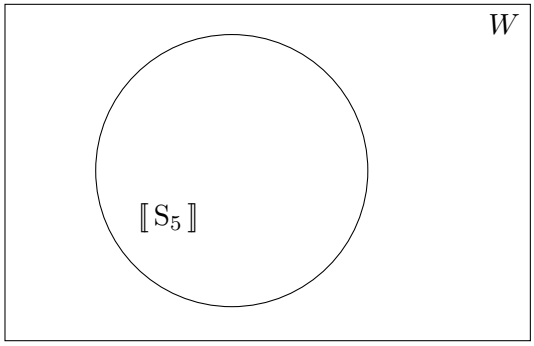

Fig. 2

Exercise 3: "Useless Connectives"

According to *IntoSem* (page 156), certain potential connectives do not exist because "there is not much practical use for" them. In particular, the right truth table in (50) is not "expressed in natural language". But consider (8):

(8) Liverpool will win if Gerrard plays or not.

Let the circles in Fig. 3 represent the propositions expressed by (9) and (10).

(9) Gerrard plays.

(10) Liverpool will win.

Determine the proposition expressed by (8), taking *Gerrard plays or not* to express the same as (11) and treating *if* as material implication.

(11) Gerrard plays or Gerrard does not play.

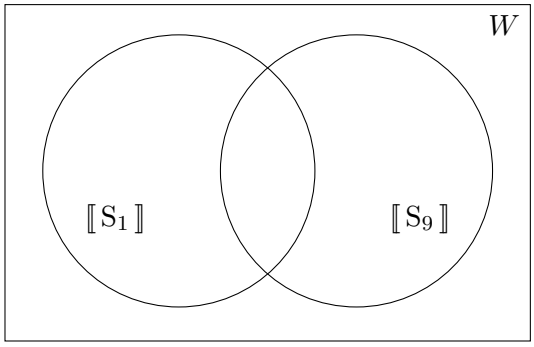

Fig. 3

Can you think of a reason for using (8)?

Exercise 4: Maps and Meaning

In Sections 2 and 3, the notion of a proposition as a set of possible worlds is introduced by way of the possible outcomes of tossing a number of coins. But it could also be introduced through an analogy to **topographic maps**.

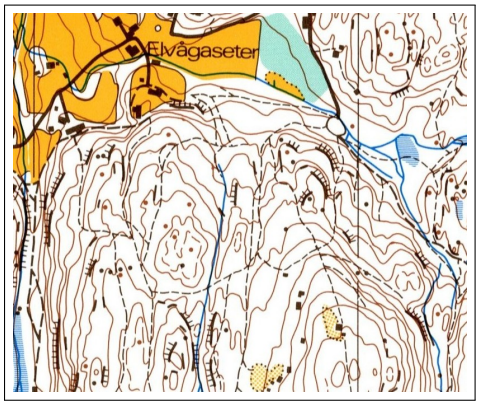

Fig. 4

Discuss the strengths or weaknesses of this analogy in the light of *IntoSem* Chapter 7, Section 3. Keywords: information, truth, terrain, contour lines.

How can we conceive of two maps M_1, M_2 where the information conveyed by M_2 includes the information conveyed by M_1? Tip: contour intervals.