Teknillinen korkeakoulu
Johdatus solmuteoriaan, kevät 2002
Laskuharjoitus 3. (8.2.)

1. a) Show that both the trefoil 3_1 and the figure-8 knot 4_1 are invertible, and that 4_1 is also amphicheiral. (Reasonable explanation is enough)
   b) What goes wrong with the following reasoning: Think about the knot 3_1 between two parallel planes. Projecting the knot (into a suitable direction) to the first plane we obtain one diagram, whereas projecting to the second, we get the mirror image of the first diagram. These are two diagrams of the same knot, and therefore 3_1 is amphicheiral.
   c) An oriented diagram is drawn on a slide. If the slide is turned over, we get another oriented diagram. What is the connection between these two knots?

2. Show that the property <The diagram of a knot has a colouring> is preserved under Reidemeister moves.

3. a) Show that the Whitehead link is not trivial by examining colourings.
   b) Can the colouring property separate 3_1 from 4_1.

4. a) Using the knottable, show that all n-crossing knots ($n \leq 5$) become trivial, when the over- and underpasses are interchanged in k crossings, and that one can choose $k \leq (n-1)/2$.
   b) Show that this property is valid in general. (Idea is enough)

Note: On week 8 or 22.2. there is neither lecture nor exercises.