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Autonomous robotics

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Exercise 1 Reading

Obtain the paper "A dynamical systems approach to task-level system integration used to plan and control autonomous vehicle motion" by Gregor Schöner and Michael Dose, published in *Robotics and Autonomous Systems* **10**:253-267 (1992) from the course web page (attention: large file, it was scanned).

As you do the following tasks, please write complete sentences in English or German to answer any of the questions.

1. Read through the whole paper roughly. You will need to understand in detail only some sections.

2. Read carefully sections 2.1 together with 3.1 and 3.2. Compare 3.1/3.2 to the 7 points of section 2.1 to establish the mapping between the abstract concepts and variables used in section 2.1 and the concrete variables and terms used in sections 3.1/3.2. Describe that mapping through a list of comments. (Not all of the 7 points can be clarified based on what you have studied... for points 4 and later of the list in section 2.1 you may need to glance ahead at 3.3.... do that for bonus).

3. Make a plot of the dynamics Equation 4 of section 3.2 (What a plot of the "dynamics" is was illustrated in the lecture). In the plot, draw attention to the attractor, the range, and the strength of the dynamics.

4. Make a drawing of the vehicle and a target, like in the lecture. Identify the angle, $\epsilon = \phi - \psi$, in that drawing. Transform Equation 4 into an equation for ϵ (assuming that ψ is constant in time). Any insight from that?

5. If any question arose while reading the paper, write it down. Alternatively, write down any new insight you gained from reading the paper.