Online Motion Planning, SS 17
Exercise sheet 9
University of Bonn, Inst. for Computer Science, Dpt. I

- *You can hand in your written solutions until Tuesday,* 27.06., 14:15*, postbox in front of room E.01 LBH.*

Exercise 25: Simple Street Strategy (4 points)

Let us assume that for the current vertices v_r and v_l the agent use the precise bisecting angle of the opening angle until either v_r or v_l changes.

Analyse the Bisecting-Angle-Strategy for a triangle where v_r and v_l do not change. Find the worst-case ratio!

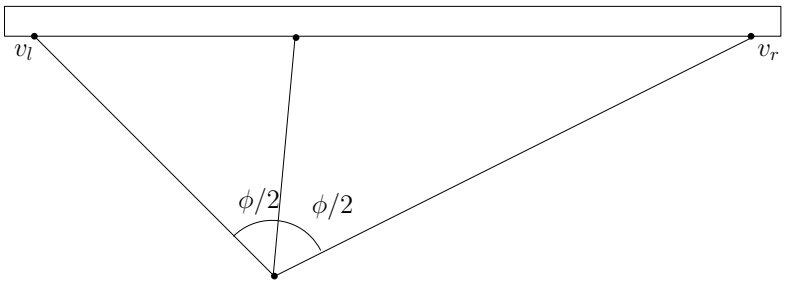

Figure 1: Moving along the bisecting angle!

Exercise 26: Steet strategy for small angles (4 points)

In the lecture we presented an optimal path for the street searching problem for opening angles $0 \leq \varphi_0 \leq \pi/2$ by setting $\sqrt{2}(\ell_1 - \ell_2) = \sqrt{2}(r_1 - r_2)$. The reason was that we would like to guarantee $w \leq \min\{\, \sqrt{2}(\ell_1 - \ell_2)\ ,\ \sqrt{2}(r_1 - r_2)\,\}$.

1. Explain the idea of the above requirement for small angles. Show that the change of reflex vertices is not a problem in the backward analysis of this case.

2. The corresponding curve is a hyberbola, present its parameter form for given starting values l and r, similar to the large angle case handled in the lecture.

Exercise 27: Combine strategy parts (4 points)

Present a formal argumentation that the application of the WCA-strategy for a sequence of funnel situations achieves a competitive ratio of $\sqrt{2}$.