Prof. G. Zachmann
René Weller

Universität Bremen
Fachbereich 3
Arbeitsgruppe CGVR
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Assignments for Virtual Reality and Physically-based Simulation - Sheet 2

Due Date written: 14. 11. 2012, programming: 21. 11. 2012

Exercise 1 (Autostereograms, *4 Punkte*)

Describe how you can construct an autostereoscopic image (Magic Eye) from a depth map.

Exercise 2 (Disparity, *4 Punkte*)

Please re-visit the slide about disparity from the lecture. Show that $\delta_2 - \delta_1 = \gamma - \alpha$.

Exercise 3 (Interaction and Scripting in VRML, *7+5 Punkte*)

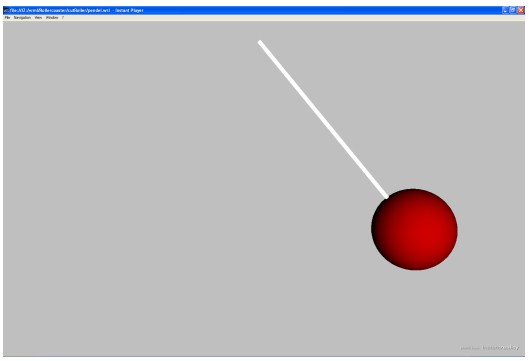

Figure 1: Pendulum

a) Figure 1 shows a classical pendulum. Your task is the animation of such a pendulum in VRML. You will find a template in the file `Rollercoaster.wrl` from line 3308. Use inline JavaScript-Code to define a function that computes the motion of the pendulum that is defined by:

$$\varphi = \varphi_{max} \cos(\sqrt{\frac{g}{l}} * t)$$

With: φ defines the current deflection of the pendulum. φ_{max} is the maximum deflection (that should be 40° in this example). g is the gravitational acceleration ($9.78033 \frac{m}{sec^2}$) and l is the length of the pendulum (0.24 in our example). You can derive the current time t by querying the VRML time sensor `TimerPendulum` in `Rollercoaster.wrl` .

Actually, your task is the implementation of the `rotationFunction` in `Rollercoaster.wrl` following line 3362. Moreover, you have to define the appropriate routing using VRML `ROUTE` commands.

b) Until now, the pendulum swings for the whole time. Consequently, it is possible that it hits the carriage if it starts at the wrong time. Obviously, this behaviour is unwanted for the passengers. Therefore, you should activate the pendulum at the correct point in time in the second part of this assignment.

   You can do this by manipulating the timer `TimerPendulum` by either using a script or changing a `ROUTE` . You will find a *proximity sensor* `PSPendulum` in line 3310. If a viewer enters the pre-defined region, the sensor delivers `TRUE` as `outEvent` for the field `isActive` . The field is set to `FALSE` if the viewer leaves it.