Theoretical Backgrounds of Audio & Graphics

Exercise 07

Task 7.1 (15min)

Manually compute the dot and cross product of vectors `a(0,0,1)` and `b(2,0,0)`. Show your calculation steps, the result alone is not enough. Explain the results briefly.

Task 7.2 (20min)

You learned about the dot product and the cross product. What functions in processing (/p5.js) implement the two operations if any? Find an application scenario (processing sketch, online) that makes use of the dot product. In which way has the dot product been used? Can you think of any other applications?

Task 7.3 Programming Basic (45min)

Extend the `tbag-exercise-07-bounce.pde` sketch as follows:

- (translate sketch to p5.js)
- Introduce PVector (p5.Vector) for the vector variables and operations
- Add interaction by adding, i.e., `mousePressed()` and manipulate the speed or direction of the ball
- Add another ball and make sure that
    - they do not intersect by manual interaction AND/OR
    - they change color only if they intersect AND/OR
    - they change direction once they collide (very advanced..)
- How would you like to improve the sketch?
- What would you need to add to do this in 3D?