



## **Assignment in Computer Graphics II**

Assignment 1 –
Computer Graphics and
Multimedia Systems Group
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## Assignment 1 [2 Points] analytic geometry (repetition)

- a) Given the points P = (2, 1, 5) and Q = (4, -1, 0) in  $\mathbb{R}^3$ .
  - Determine the parametric line equation of form  $\vec{g}(t) = \vec{p} + t\vec{u}$ , so that the straight line  $\vec{g}$  passes through the points *P* and *Q*.
  - What distance does the point R = (2, -2, 4) to the line  $\vec{g}$ ?
- b) Consider the plane *e* of the form  $\vec{e}(s,t) = \vec{p} + s \cdot \vec{u} + t \cdot \vec{v}$  in  $\mathbb{R}^3$  with the vectors  $\vec{p} = (3,2,1)^T$ ,  $\vec{u} = (2,0,1)^T$  and  $\vec{v} = (1,3,3)^T$ 
  - Determine the normal vector  $\vec{n}$ , which is orthogonal to the plane of e.
  - Show that the normal vector  $\vec{n}$  is really orthogonal to the vectors  $\vec{u}$  and  $\vec{v}$ .

## Assignment 2 [2 Points] barycentric coordinates

Given is a triangle with the edges A = (3,0,0), B = (0,3,0) and C = (0,0,3).



Calculate for both rays the intersection with the triangular plane using barycentric coordinates.

- What are the parameters of the coefficients α and the barycentric coordinates (*s*<sub>1</sub>, *s*<sub>2</sub>) of the intersections?
- Are the intersections within the triangle (A, B, C)? (Reason necessary)

Hand-in: 26.10.2015, at beginning of the lecture.