Budapest University of Technology and Economics
Department of Architectural Geometry and Informatics
Descriptive Geometry 2
Year 2017-2018, 2nd (spring) semester

2nd Drawing

Tint or pencil, size A2
Deadline for delivery: May 7, 2018

TORUS IN ORTHOGONAL AXONOMETRY, HYPERBOLOID OF ONE SHEET IN AXONOMETRY, HYPERBOLID OF ONE SHEET IN PESPECTIVE, HYPERBOLIC PARABOLOID, CONOID; INTERSECTION WITH PLANE, HELICOID, EARTHWORKS

1. Represent a hyperboloid of one sheet in orthogonal axonometry. The base circle is in the plane [***xy***] about the origin, the radius of the throat circle is the half of the base circle and the top circle is congruent with the base circle. Represent a co-axial ring torus on the top of the hyperboloid such that the top circle of the hyperboloid is the lowest circle of the torus. Construct the contour and show the visibility.

2. Represent a hyperboloid of one sheet in perspective. The axis is perpendicular to the picture plane, the base circle lies in the picture plane, the radius of the throat circle is the half of the base circle and the top circle in front of the picture plane is congruent with the base circle. Construct the self-shadow outline, the cast shadow on the picture plane and the projected shadow at a proper direction of lighting.

3. Let the three skew quadrilaterals $A_{2a}B_0O_aF_0$, $C_{2a}D_0O_aB_0$ and $E_{2a}F_0O_aD_0$ be given such that the points ***ABCDEF*** form a regular hexagon about the point ***O***. Represent the composite surface formed by the three hyperbolic paraboloids (saddle surfaces) defined by the skew quadrilaterals with 3+3 generators and contours, construct the saddle points and the axes too. Represent all shadows and shades at a proper direction of lighting.

4. Represent a conoid in frontal axonometry. The base curve is an upper semicircle in the plane [***xz***] with the center ***O***. The directrix of the conoid is parallel to the ***x*** axis lying in the plane [***xy***]. Cut the surface bay the tangent plane at a point. Construct the contour and show the visibility of the part below the plane of intersection.

5. Represent a helical surface in bird1eye view axonometry with the radius of ***5r*** such that it has a spindle with the radius of ***r***. Determine the pitch of the helicoid such that the image of the helix on the spindle has cuspidal points. Construct contour, show the visibility of the rulings, the helicoid and the spindle cylinder

6. Interpolate contour curves in the figure 1. Construct the earthworks to the horizontal platform and the inclining road. The slope of the fill is 6/4, the slope of the cut is 5/4. Find the highest point of the headline of the cut, apply section. Show the gradient lines of the slopes, use colors for the earthworks: green for fill, brown for cut, gray for platform and road).

February 5, 2018, Budapest.

Dr. Pál Ledneczki
associate professor