

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Department of Mechanical Engineering

2.700/2.701 Principles of Naval Architecture

Fall 2014

Project #2: Hydrostatics

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Date due: October 1, 2014

The file "hull.3dm" contains the hull sections in the form of points and curves¹, as well as the profiles of the bow and stern. Using Rhinoceros implement the following tasks:

1. Approximate the given hull points with smooth curves (ship sections), which have uniform distribution of control points along their length, and smooth distribution of curvature without unnecessary inflection points. The smoothed ship sections should be as close as possible to the original ones.

Deliverables: The .3dm file that contains the original and smooth ship sections. A technical report describing the steps that you follow and also 3D snapshots of the ship sections with the curvature graph on (Display scale = 105).

2. By interpolating the smooth ship sections create a surface that is smooth everywhere except from the stern area.

Deliverables: The .3dm that contains 3D model for the ship hull. A technical report describing the steps that you follow; 3D snapshots of the ship hull model and 3D snapshots of the surface curvature (curvature range ± 0.05).

3. Compute the hydrostatic characteristics (displacement; center of flotation; horizontal and vertical position of the center of buoyancy, wetted surface; waterplane area) for 5 waterlines, which are uniformly distributed over the vertical direction.

Deliverables: Hydrostatic diagram.

The 3dm files should be emailed to the instructor with the filename format:

'LAST_NAME_x.3dm' where x is 1 for the ship sections and 2 for the 3D model.

¹ The hull data used in this project is a modification from a hull used in a CAD/CAM project by Prof. Kaklis and Dr. Gkinis - School of Naval Architecture and Marine Engineering at National Technical University of Athens.

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