



Vortex Structures at a Rotating Ship Propeller

CHRISTOPH PETZ (ZIB, Berlin), TINO WEINKAUF (ZIB, Berlin), HEINRICH STRECKWALL (HSVA, Hamburg),
FRANCESCO SALVATORE (INSEAN, Rome), BERND R. NOACK (TU Berlin), HANS-CHRISTIAN HEGE (ZIB, Berlin)

The vortical flow around a rotating ship propeller is visualized illustrating features of the velocity and the pressure field in the reference frame of the ambient fluid. The pattern on the propeller surface indicates the direction of the skin friction. The tip vortices are visualized by bundles of illuminated streamlines. The transparent blue surface represents a constant pressure level and marks the center of the vortical region. Its opacity emphasizes the region in front of the propeller. The helical motion in the propeller wake is apparent from streamlines starting in a dense bundle near the propeller hub. The magnitude of the transverse velocity components is depicted in planes perpendicular to the propeller axis by white isolines in front of the propeller. This shows the decreasing influence of the propeller form to the shape of these velocity components.

The presented propeller is the INSEAN E779A propeller provided by INSEAN, the CFD simulation was done at HSVA. The work is supported by the EU project 516201, VIRTUE - The Virtual Tank Utility in Europe.