Announcing the Final Examination of Alfredo Ruiz for the degree of Master of Science

Time & Location: November 1, 2010 at 11:00 AM in ENGR2 324
Title: WEB-BASED TIDAL TOOLBOX OF ASTRONOMIC TIDAL DATA FOR THE ATLANTIC INTRACOASTAL WATERWAY, ESTUARIES AND CONTINENTAL SHELF OF THE SOUTH ATLANTIC BIGHT

A high-resolution astronomic tidal model has been developed that includes detailed inshore regions of the Atlantic Intracoastal Waterway and associated estuaries along the South Atlantic Bight. The unique nature of the model’s development ensures that the tidal hydrodynamic interaction between the shelf and estuaries are fully described. Harmonic analyses of the model output result in a database of tidal information that extends from a semi-circular arc (radius ~750 km) enclosing the South Atlantic Bight from the Carolina coasts to the Florida Keys, onto the continental shelf and into the full estuarine system.

The need for tidal boundary conditions (elevation and velocity) for driving inland waterway models has motivated the development of a software application to extract results from the tidal database, which is the basis of this thesis. In this tidal toolbox, the astronomic tidal constituents can be re-synthesized for any open water point in the domain over any interval of time in the past, present, or future. The application extracts model results interpolated to a user’s exact geographical points of interest, desired time interval, and tidal constituents. Quality of the results, as assessed at a number of tidal gauging stations, is available at the user’s request. All of the aforementioned features work within a zoom-able geospatial interface for enhanced user interaction.

In order to make tidal elevation and velocity data available, a web service serves the data to users over the internet. The tidal database of 497,847 nodes and 927,165 elements has been preprocessed and indexed to enable timely access from a typical modern web server. The pre-processing and web services required are detailed in this thesis.

Major: Civil Engineering

Educational Career:
Bachelor's of Civil Engineering, BS, 2006, University of Central Florida

Committee in Charge:
Dr. Scott C. Hagen, Chair, Civil, Environmental, and construction Engineering
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Approved for distribution by Dr. Scott C. Hagen, Committee Chair, on October 4, 2010.

The public is welcome to attend.