

Tide Prediction for Persian Gulf Coasts based on Harmonic Analysis

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Abstract

Studying, understanding and forecasting of tidal elevation are very important because of its effects in many engineering activities such as navigation and marine transportation, fisheries, harbor management and any other coastal and offshore engineering problems.

If the variations of sea surface elevation are measured at a station during a period, it is possible to forecast its variation at any other period using some computational approaches such as harmonic analysis, artificial neural network and etc.

In this study, two source- code programs of IOS tidal package (tidal heights analysis program and tidal heights prediction program) were used in order to forecast the tide elevation at some stations which enough measurements of their sea surface elevation existed.

At the first, using the tidal heights analysis program, the measured sea surface elevations were analyzed and the values of amplitude and phase of different tidal constituents were determined. In this section in order to determine the effect of length of recorded data, various analyses based on one year, 6 months, 3 months and one month data were conducted.

Then, at the next stage, the tidal elevations were predicted based on the results of mentioned various analyses using the tidal heights prediction program for those stations where measured sea surface elevation existed.

Comparisons and evaluations showed that the applied method and programs in this study, are capable for forecasting the tidal elevation in the studied stations. It can be also deduced that the accuracy of the prediction based on one year data analysis is more than the predictions based on 6 months, 3 months and one month data analyses.

Keywords

Tidal constituents, amplitude, phase, IOS tidal package