INTRODUCTION TO COASTAL HYDRAULICS

HOMEWORK 3

Question 1

Waves were recorded for 10 minutes. Wave number is 100 at this record. Calculate the significant wave height using the table below ($H_{1/3}$=H_s).

H (m)	Wave Number	H (m)	Wave Number
0.60	15	1.8-1.99	2
0.6-0.79	15	2.0-2.19	2
0.8-0.99	7	2.2-2.39	2
1.0-1.19	17	2.4-2.59	3
1.2-1.39	5	2.6-2.79	1
1.4-1.59	9	2.8-2.99	1
1.6-1.79	20	3.0-3.19	1

Question 2

a) Wind speed (U) is 20 m/sec, fetch length (F_g) is 1700 km and duration of wind (t) is 65 hours,
b) Wind speed (U) is 10 m/sec, fetch length (F_g) is 300 km and duration of wind (t) is 20 hours.
Calculate deep water significant wave heights and periods for both cases.

Question 3

The surface elevation record measured at 2 Hz sampling frequency (two measurements per second) for 5 minutes is shown in Figure 1. The wave spectrum was calculated using this data (Figure 2). According to this;

1) Determine the significant wave height and the mean wave period using zero up/down-crossing method.
2) Determine the significant wave height and the mean wave period using wave spectrum.
3) Compare the wave parameters found from (1) and (2). Interpret the results.

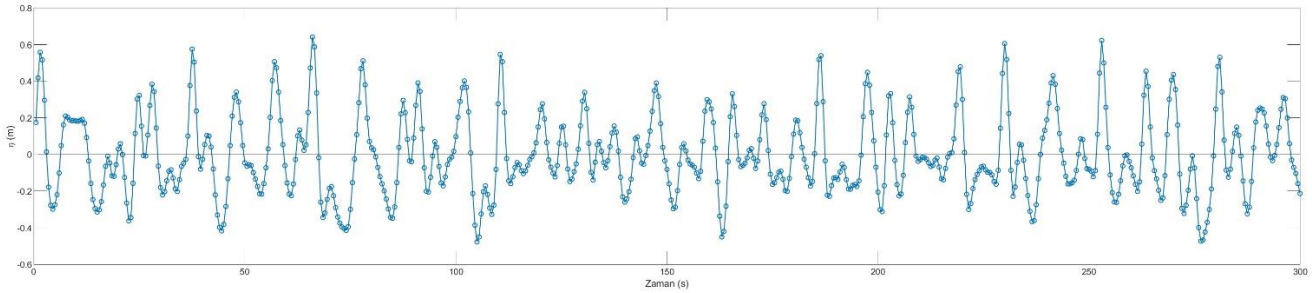

Figure 1 Measured surface deviation about the mean

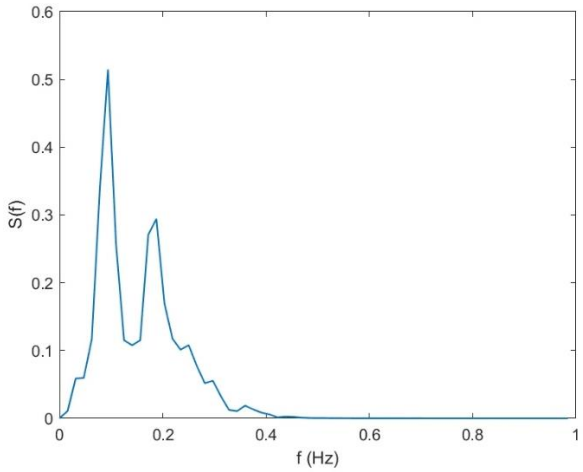

Figure 2 Wave spectrum

Additional information:

$m_n = \int_0^\infty f^n S(f)\, df$

$m_0 = \int_0^\infty S(f) df =,$

$m_2 = \int_0^\infty f^2 S(f) df =$

$H_{m0} = 4\sqrt{m_0}$

$T_{m02} = \sqrt{m_0 / m_2}$