

AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

DIRECTIONAL WAVE SPECTRA

BY

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M.Sc, B.Sc Civil Engineering

Thesis
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Irrigation and Hydraulics Department

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Cairo 1990

Approval Sheet

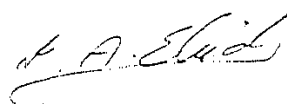
DIRECTIONAL WAVE SPECTRA

By

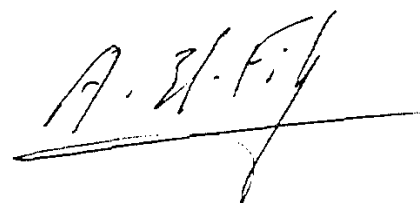
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STATEMENT

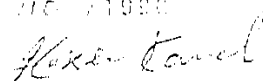
This dissertation is submitted to Ain Shams University
for the degree of Ph.D. in Civil Engineering.

The work included in this thesis was carried out by
the author in the department of Irrigation and Hydraulics ,
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No part of this thesis has been submitted for a degree
or a qualification at any other University or Institution.

Date : 3 /10 /1998

Signature :



Name : Hussein Kamel Mostafa

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TABLE OF CONTENTS

	Page ----
ACKNOWLEDGEMENT	1
TABLE OF CONTENTS	2
LIST OF FIGURES	6
LIST OF TABLES	9
CHAPTER 1 : INTRODUCTION	10
CHAPTER 2 : THEORETICAL CONSIDERATIONS.....	14
2.1 Introduction	14
2.2 Wave Observation and Measurement	15
2.2.1 Wave Instruments Used from Stationary Platforms	17
2.2.2 Wave Instruments Used from Moving Platforms	19
2.3 Measurements of Directional Seas	20
2.4 Sea Wave Spectra	23
2.5 Concept of Directional Spectrum	33
2.5.1 Definition of Directional Spectrum ...	34
2.5.2 Parameters of Wave Directional Spectrum	
2.5.3 Cross Power Spectra	37

	2.5.4	Methods of Estimation of Directional Spectrum	41
CHAPTER	3 :	DIRECTIONAL SPECTRUM COMPUTER PROGRAM	
	3.1	Introduction	43
	3.2	Calculation Flow	44
	3.2.1	Surface Elevation Time Series	44
	3.2.2	FFT Calculation	47
	3.2.3	Calculation of Cross Spectrum and Wave Direction	49
	3.3	Program Configuration	55
CHAPTER	4 :	DIGITIZING AND SIMULATION COMPUTER PROGRAMS	56
	4.1	Introduction	57
	4.2	Digitizing Program	58
	4.2.1	Curve Reader Program 2	57
	4.2.2	Curve Reader Program 3	60
	4.3	Simulation Program	64
CHAPTER	5 :	LABORATORY WORK.....	69
	5.1	Laboratory Equipments	69
	5.1.1	Harbour Basin	69
	5.1.2	Wave Generating System	72
	5.2	Physical Model	73
	5.3	Measuring Devices	79

LABORATORY WORK
WAVE GAUGE No: 5
NTOTAL = 1024

-.131	-.128	-.125	-.116	-.107	-.015	.077	.095	.113	.163
.214	.217	.220	.104	-.012	-.015	-.017	-.171	-.325	-.168
-.012	.134	.280	.467	.655	.390	.125	-.066	-.256	-.434
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.155	.345	.536	.343	.149	.030	-.089	-.235	-.381	-.414
-.446	-.336	-.226	-.199	-.173	.050	.274	.289	.303	.285
.268	.096	-.077	-.086	-.095	-.092	-.089	-.155	-.220	-.262
-.303	-.276	-.250	-.128	-.006	.148	.303	.312	.321	.015
-.292	-.366	-.440	-.410	-.381	-.128	.125	.113	.101	.113
.125	.169	.214	.256	.298	.015	-.268	-.122	.024	.152
.280	.238	.196	.130	.065	-.009	-.083	-.041	.000	.065
.131	.131	.131	.101	.071	.063	.054	.033	.012	-.021
-.054	-.051	-.048	.051	.149	.039	-.071	-.152	-.232	-.232
-.232	-.146	-.060	-.036	-.012	.009	.030	.009	-.012	-.036
-.060	-.030	.000	.015	.030	.012	-.006	-.041	-.077	-.080
-.083	-.077	-.071	-.071	-.071	-.089	-.107	-.080	-.054	.074
.202	.178	.155	.060	-.036	-.078	-.119	-.095	-.071	-.021
.030	.009	-.012	-.036	-.060	-.098	-.137	-.009	.119	.107
.095	.060	.024	.033	.042	.146	.250	.093	-.065	-.161
-.256	-.146	-.036	.054	.143	.200	.256	.072	-.113	-.163
-.214	-.060	.095	.160	.226	.214	.202	.024	-.155	-.322
-.488	-.229	.030	.167	.303	.285	.268	.176	.083	.003
-.077	-.086	-.095	-.098	-.101	-.119	-.137	-.149	-.161	-.137
-.113	.068	.250	.250	.250	.211	.173	-.018	-.208	-.214
-.220	-.161	-.101	-.113	-.125	-.157	-.190	-.119	-.048	-.039
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.161	.146	.131	.098	.065	.077	.089	.068	.048	.119
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-.232	-.167	-.101	-.051	.000	.041	.083	.157	.232	.208
.184	.146	.107	-.110	-.327	-.300	-.274	-.211	-.149	.092
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-.173	-.056	.060	.197	.333	.280	.226	.056	-.113	-.092
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.089	.045	.000	.000	.000	-.003	-.006	-.018	-.030	-.018
-.006	.045	.095	.060	.024	.003	-.018	-.074	-.131	.006
.143	.128	.113	-.018	-.149	-.241	-.333	-.060	.214	.247
.280	.277	.274	.175	.077	.050	.024	-.012	-.048	-.098
-.149	-.211	-.274	-.303	-.333	-.276	-.220	-.146	-.071	.021
.113	.217	.321	.321	.321	.252	.184	.054	-.077	-.205
-.333	-.377	-.422	-.312	-.202	-.142	-.083	.012	.107	.167
.226	.271	.315	.298	.280	.265	.250	-.125	-.500	-.247
.006	.093	.179	.289	.399	.622	.845	.798	.750	.691
.631	.544	.458	-.086	-.631	-.619	-.607	-.407	-.208	-.110
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.214	.107	.000	-.041	-.083	-.092	-.101	-.072	-.042	.009
.060	.093	.125	-.003	-.131	-.119	-.107	-.098	-.089	-.045
.000	.083	.167	.036	-.095	-.054	-.012	-.038	-.065	-.119

-.173	-.170	-.167	-.018	.131	.172	.214	.176	.137	.059
-.018	.015	.048	.078	.107	.012	-.083	-.137	-.190	.003
.196	.232	.268	.253	.238	.161	.083	.044	.006	-.110
-.226	-.157	-.089	-.045	.000	.009	.018	.021	.024	.102
.179	.155	.131	.006	-.119	-.178	-.238	-.276	-.315	-.047
.220	.220	.220	.161	.101	.003	-.095	-.155	-.214	-.232
-.250	-.035	.179	.176	.173	.170	.167	.140	.113	.026
-.060	-.111	-.161	-.241	-.321	-.119	.083	.063	.042	.080
.119	.125	.131	.181	.232	.217	.202	.083	-.036	-.128
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.530	.655	.779	.755	.732	.642	.553	.255	-.042	-.080
-.119	-.250	-.381	-.401	-.422	-.247	-.071	.036	.143	.271
.399	.405	.411	.331	.250	.199	.149	.090	.030	.047
.065	.074	.083	.050	.018	-.032	-.083	-.017	.048	.125
.202	.176	.149	.083	.018	-.154	-.327	-.285	-.244	-.113
.018	.143	.268	.325	.381	.393	.405	.369	.333	.095
-.143	-.158	-.173	-.188	-.202	-.033	.137	.134	.131	.125
.119	.039	-.042	-.042	.000	.000	.000	.000	.000	.000

APPENDIX 6

RESULTS OF FIELD WORK

- a- Computer print-out
- b- Measured time series

FIELD WORK
 SAMPLE NO:1
 TIME 1200

No: OF DATA= 1024
 DISTANCE BET.SENSORS = 10.00 meters
 time step= .42 SEC

ACTUAL WAVE HEIGHT = 0.375 meters
 ACTUAL WAVE PERIOD = 8.11 secs

DEPTH OF WATER AT GAUGE = 10.00 meters

I	PERIOD	% ENERGY	ANGLE(D)
13	28.67200000	3.03844700	.00000000
26	16.54154000	2.71510400	.00000000
27	15.92889000	2.93854400	.00000000
48	8.96000000	2.64439700	-43.57000000
52	8.27076900	3.01040500	.00000000
53	8.11471700	7.33053100	65.03600000
54	7.96444500	4.40724500	.00000000
57	7.54526300	2.50082600	.00000000
60	7.16800000	6.87031100	65.43000000
62	6.93677400	4.11913100	.00000000
63	6.82666600	8.81495900	56.60000000

SIGNIFICANT WAVE HEIGHT = .35 meters

FIELD WORK
SAMPLE NO:2
DATE 7/8/1989
TIME 1600

No: OF DATA= 1024
DISTANCE BET.SENSORS = 10.00 meters
time step= .42 SEC

ACTUAL WAVE HEIGHT = 0.360 meters
ACTUAL WAVE PERIOD = 7.58 secs

DEPTH OF WATER AT GAUGE = 10.00 meters

I	PERIOD	% ENERGY	ANGLE(I)
3	143.36000000	3.28351900	.00001000
4	107.52000000	2.82090500	.00001000
55	7.81963600	4.48850300	.00001000
56	7.68000000	7.88045100	64.96000000
57	7.54526300	5.40161800	65.25000000
71	6.05746500	3.20536800	.00000000

SIGNIFICANT WAVE HEIGHT = .32 meters

FIELD WORK
 SAMPLE No:3
 DATE 7/8/1989
 TIME 2000

No: OF DATA= 1024
 DISTANCE BET.SENSORS = 10.00 meters
 time step= .42 SEC

ACTUAL WAVE HEIGHT = 0.44 meters
 ACTUAL WAVE PERIOD = 7.50 secs

DEPTH OF WATER AT GAUGE = 10.00 meters

I	PERIOD	% ENERGY	ANGLE(I)
16	26.88000000	2.87258200	.00000000
51	8.43294100	7.53219000	72.88000000
54	7.96444500	8.50069500	73.05000000
55	7.81963600	5.24248800	73.10000000
56	7.68000000	4.68751400	.00000000
58	7.41517300	2.63916000	.00000000
67	6.41910400	2.53871600	.00000000

SIGNIFICANT WAVE HEIGHT = .40 meters