

Coastal Navigation

Homework #4

Questions

1. Let's revisit question #2 from last week's homework.
 - a) What is the track from Buoy R "2" to Aquatic Park?
 - b) The winds are west at 22 knots when we depart R "2" at 1530. Assume a leeway of 4° and a boat speed of 6 knots. What course, corrected for leeway, should you steer from R "2" to lay Aquatic Park?
2. Using the Deck Log entries below, determine the range and bearing to Mooring Buoy "CGDB" (in the SW corner of Drakes Bay).

Time	Log	Course	Weather	Comments	Engine
1018	35.7	225M	WNW 20kts Seas 8'	Departed Buoy "1DR", closehailed estimate 7° leeway, speed 5 knots	Off
1107	39.8	320M	"	Tacked; leeway & speed constant	"
1236	47.2	305M	WNW 20kts Seas 6'	Wind backed, came up to 305M, leeway & speed constant	"
1338	52.8		"	Depth sounder reads 60 feet	

3. Departing Buoy "SC" (Light List # 4080) at 0100, you set a close-hauled course of 244M on starboard tack. Leeway is estimated to be 4° and you are making 5.5 knots through the water. At 0400, when you tack through 95° , your boat speed drops to 5 knots and leeway is now 6° . At 0615 the lookout reports seeing a red light ahead but can't make out any pattern to the flashing.
 - a) What do you think is out there and why can't the light's pattern be discerned?
 - b) At 0700 you tack at Buoy R "24" (FI R 6s WHIS) at Año Nuevo Island and your helm reports being able to hold a close-hauled course at 270M with a boat speed of 6.5 knots. You now estimate leeway at 5° . At 0742, what are the water depth and the bearing to Pigeon Pt. Light (L37°10.9'N x λ 122°23.6'N)?
4. At Mile Rocks Light you tack to port and want to sail to the red over green Four Fathom Bank Buoy (Light List # 4240). The wind is from the SSW at 22 knots and you anticipate 6° of leeway. You depart Mile Rocks Light with a boat speed of 6 knots at 1700PDT on 09APR97.
 - a) What is the track?
 - b) What is the course to steer corrected for both leeway and current to lay the buoy?

5. You wish to sail from South Beach Harbor (approximately one-half mile south of where the Bay Bridge enters San Francisco) to the Oakland Inner Harbor Entrance Channel, crossing the Bay at approximately 1100PDT on the morning of 09APR97. You will take your departure from the light at the north exit of the harbor (FI G 2.5s "1") and shape your course to Buoy R "6" (FI R 2.5s).
 - a) What station will you use to determine the current?
 - b) What is the set and drift of the current at 1100PDT (1000PST)?
 - c) If your boat speed is 4.5 knots, what course would you steer?

6. You wish to make good a course of 279T, in an area with 12°East variation.
 - a) What is the Magnetic course?
 - b) The ship's deviation table shows 4° West deviation on this course. What course do you give to your helm?

7. You are about to sail from your anchorage at Paradise Cove (on the north shore of Tiburon) to the Berkeley Yacht Harbor. Because of fog in the Bay, you plan to use Southampton Shoal Light as a waypoint. The wind is blowing hard from the southwest in the channel and you anticipate 4° of leeway.
 - a) What course do you steer for Southampton Shoal Light if you clear Pt. Chauncey at 1900PDT on 21AUG97 with a boat speed of 4.8 knots?
 - b) How do you expect the effect of the current to change east of Southampton Shoal Light?

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Coastal Navigation Homework #4 Answers

1. a) Track is 145M
b) Course to steer, corrected for leeway, is 115M ([see chart](#))
2. The range and bearing to Buoy "CGDB" are 5.0 nm @ 245M ([see chart](#))
3. a) It is probably Buoy R "24" off Año Nuevo Island, and the buoy is disappearing behind the ocean swells, making it impossible to discern the characteristic of the Light from this distance.
b) The water depth is 40 fathoms or 240 feet. The bearing to Pigeon Pt. light is 007M ([see chart](#))
4. a) 294M ([see chart](#))
b) 307M ([see completed Comprehensive Current Form](#))
5. a) #317 Rincon Point, 0.57 nm east of ([see chart](#))
b) 141T at 2.7 knots ([see completed Comprehensive Current Form](#))
c) 016M
6. a) 267M
b) 271C
7. a) 079M ([see chart](#))
b) Based on the shallowness of the Bay east of Southampton Shoal Lt. and the speed ratios for substations #517 & 521, the effect of the current should rapidly decrease.

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Homework 4, Problem #4: Current Calculation

COMPREHENSIVE CURRENT SITUATION FORM

Date: 09APR97

Reference Station: Golden Gate

Substation: #193 Pt. Bonita 0.95 miles SSE of

Time Difference

Speed Ratio

Min. before Flood: - 0h 28min

Flood: .7 kt

Ebb: .8 kt

Flood: - 0h 38min

Min. before Ebb: - 0h 28min

Direction

Ebb: - 0h 51min

Flood: 072T

Ebb: 239T

Reference Station: Golden Gate

Sub Station: #193 Pt. Bonita
0.95 miles SSE of

Time	Velocity
<u>1506</u>	Slack Water
<u>1733</u>	<u>3.4 ebb</u>
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water

Time	Velocity
<u>1438</u>	Slack Water
<u>1642</u>	<u>2.7 ebb</u>
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water

Velocity of Current at Time: 1600 PST

Duration of Slack

Interval between Slack & Desired Time: 1h 22min

Time of Max Current:

Interval between Slack & Max Current: 2h 04min

Maximum Current:

Velocity of Max Current: (ebb) 2.7kts
(flood)

Desired Maximum:

Factor from Table 3: .9

Period from Table 4:

Sum of Periods:

Desired Velocity: 2.43kts

Average of Periods:

Duration of a Period:

Direction: 239T

Time of Duration:

(Duration of a Period is the time of Slack ± one-half of the Average Period)

Homework 4, Problem #5: Current Calculation

COMPREHENSIVE CURRENT SITUATION FORM

Date: 09APR97

Reference Station: Golden Gate

Substation: #317 Rincon Pt. 0.57 miles East of

Time Difference

Speed Ratio

Min. before Flood: - 0h 50min

Flood: .7 kt

Ebb: .6 kt

Flood: - 0h 44min

Min. before Ebb: - 0h 52min

Direction

Ebb: + 0h 43min

Flood: 141T

Ebb: 332T

Reference Station: Golden Gate

Sub Station: #317 Rincon Pt.
0.57 miles East of

Time	Velocity
<u>0850</u>	Slack Water
<u>1148</u>	4.2 flood
<u> </u>	Slack Water
<u> </u>	
<u> </u>	Slack Water
<u> </u>	
<u> </u>	

Time	Velocity
<u>0800</u>	Slack Water
<u>1104</u>	2.94 flood
<u> </u>	Slack Water
<u> </u>	
<u> </u>	Slack Water
<u> </u>	
<u> </u>	

Velocity of Current at Time: 1000 PST

Duration of Slack

Interval between Slack & Desired Time: 2h 00min

Time of Max Current:

Interval between Slack & Max Current: 3h 04min

Maximum Current:

Velocity of Max Current: (ebb)
(flood) **2.94kts**

Desired Maximum:

Factor from Table 3: .9

Period from Table 4:

Sum of Periods:

Desired Velocity: **2.65kts**

Average of Periods:

Duration of a Period:

Direction: **141T**

Time of Duration:

(Duration of a Period is the time of Slack ± one-half of the Average Period)

Homework 4, Problem #7: Current Calculation

COMPREHENSIVE CURRENT SITUATION FORM

Date: 21AUG97

Reference Station: Golden Gate

Substation: #505 Pt. Chauncey 1.3 miles East of

Time Difference

Speed Ratio

Min. before Flood: - 0h 03min

Flood: .4 kt

Ebb: .4 kt

Flood: + 0h 30min

Min. before Ebb: + 0h 45min

Direction

Ebb: + 0h 11min

Flood: 340T

Ebb: 162T

Reference Station: Golden Gate

Sub Station: #505 Pt. Chauncey
1.3 miles East of

Time	Velocity
<u>1535</u>	Slack Water
<u>1822</u>	4.5 ebb
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water

Time	Velocity
<u>1620</u>	Slack Water
<u>1833</u>	1.8 ebb
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water
<u> </u>	Slack Water

Velocity of Current at Time: 1800 PST

Duration of Slack

Interval between Slack & Desired Time: 1h 40min

Time of Max Current:

Interval between Slack & Max Current: 2h 13min

Maximum Current:

Velocity of Max Current: (ebb) 1.8kts
(flood)

Desired Maximum:

Factor from Table 3: 1.0

Period from Table 4:

Sum of Periods:

Average of Periods:

Duration of a Period:

Desired Velocity: 1.8kts

Time of Duration:

Direction: 162T

(Duration of a Period is the time of Slack ± one-half of the Average Period)