



611\_ITCS306

Syllabus &amp; CLOs

Participants

Grades

 General Lectures Practice Problems Sample codes**Assignments** Coding assignments CDF files

Dashboard

Cancel &amp; make up class

My courses

Site home

Calendar

 Flag question**Method**

IT Program / Semester 1 of 2018 / 2nd Year (Sophomore) / ITCS306\_Numerical Method / Assignments / Week 12 big quiz

ember 2018, 3:53 PM

ember 2018, 11:07 PM

1.00 (100%)

owing is a measure of how well the calculated regression line fits the data?

 Fit Residual Correlation Coefficient ✓ Standard Deviation Regression Deviation

ver is: The Correlation Coefficient

owing best describes the purpose of regression analysis?

ribe how better data can be obtained from independence.

- b. To describe the relationship between a dependent variable and one or more independent variables. ✓
- c. To analyse the regression form of a Euclidean curve.
- d. To estimate the mean of data.

The correct answer is: To describe the relationship between a dependent variable and one or more independent variables.

**Question 3**

Correct

Mark 1.00 out of 1.00

 Flag questionWhich of the following is the equation for the standard error of the estimate in simple linear regression from a sample with  $n$  data points?

Select one:

- a.

$$\sqrt{\frac{S_e}{n-1}}$$

- b.

$$\sqrt{\frac{S_e}{n-2}}$$

- c.

$$\sqrt{\frac{S_e}{n}}$$

- d.

$$\sqrt{\frac{S_e}{n-2}}$$

The correct answer is:

$$\sqrt{\frac{S_e}{n-2}}$$

**Question 4**

Correct

Mark 1.00 out of 1.00

 Flag question

What is the equation of the regression line in simple linear regression?

Select one:

- a.

$$y = a_0 + a_1x + a_2x^2$$

- b.

$$y = ax$$

- c.

$$y = a_0 + a_1x_1 + a_2x_2$$

- d.

$$y = a_0 + a_1x$$

The correct answer is:

**QUIZ NAVIGATION**

1	2	3	4	5
✓	✓	✓	✓	✓
6	7	8	9	10
✓	✓	✓	✓	✓
11	12	13	14	15
✓	✓	✓	✓	✓
16	17	18	19	20
✓	✓	✓	✓	✓
21	22	23	24	
✓	✓	✓	✓	

[Show one page at a time](#)[Finish review](#)

$$y = a_0 + a_1 x$$

**Question 5**

Correct

Mark 1.00 out  
of 1.00

Flag question

If we perform multiple simple linear regression on data where the  $y$  variable depends on two independent  $x$  variables, what kind of mathematical object are we creating to model the relationship?

Select one:

- a. plane ✓
- b. circle
- c. sphere
- d. line

The correct answer is: plane

**Question 6**

Correct

Mark 1.00 out  
of 1.00

Flag question

What transformation would you use to linearize the power equation

$$y = ax^b ?$$

Select one:

- a. Take the inverse of both sides (e.g.  $1/y$ )
- b. Use the Laplace transform.
- c. Take logs of both sides ✓
- d. Find Taylor's series.

The correct answer is: Take logs of both sides

**Question 7**

Correct

Mark 1.00 out  
of 1.00

Flag question

What transformation would you use to linearize the saturation growth rate equation

$$y = a \frac{x}{x+b} ?$$

Select one:

- a. Take logs of both sides
- b. Find Taylor's series.
- c. Use the Laplace transform.
- d. Take the inverse of both sides (e.g.  $1/y$ ) ✓

The correct answer is: Take the inverse of both sides (e.g.  $1/y$ )

**Question 8**

Correct

Mark 1.00 out  
of 1.00

Flag question

Which of the following is a matrix equation we can use to find the coefficients of our regression line (or surface)?

Select one:

- a.
- b.
- c. ✓
- d.

$$A = (Z^T Z) Z^T Y$$

$$A = (Z^T Z)^{-1} Z^T Y$$

$$A = (Z^T Z)^{-1} Z^T Y$$

$$A = (Z^T)^{-1} Z^T Y$$

The correct answer is:

$$A = (Z^T Z)^{-1} Z^T Y$$

**Question 9**

Correct

Mark 1.00 out  
of 1.00

Flag question

What is the equation for the first Lagrange polynomial for quadratic interpolation?

Select one:

- a.
- b.
- c. ✓
- d.

$$L_1 = \frac{x - x_1}{x_0 - x_1}$$

$$y = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1) + b_3(x - x_0)(x - x_1)(x - x_2)$$

$$L_1 = \frac{(x - x_1)(x - x_2)}{(x_0 - x_1)(x_0 - x_2)}$$

$$b_1 = \frac{y_1 - y_0}{x_1 - x_0}$$

The correct answer is:

$$L_1 = \frac{(x - x_1)(x - x_2)}{(x_0 - x_1)(x_0 - x_2)}$$

**Question 10**

Correct

Mark 1.00 out  
of 1.00Flag  
question

Which of the following is Lagrange's form for the interpolating quadratic?

Select one:

 a.

$$f_2(x) = L_1 f(x_1) + L_2 f(x_2) + L_3 f(x_3)$$

 b.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1) + b_3(x - x_0)(x - x_1)(x - x_2)$$

 c.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

 d.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1)$$

The correct answer is:

$$f_2(x) = L_1 f(x_1) + L_2 f(x_2) + L_3 f(x_3)$$

**Question 11**

Correct

Mark 1.00 out  
of 1.00Flag  
question

If we have  $n$  data points, what is the maximum degree of the interpolating polynomial?

Select one:

 a. $n$  b. $n - 2$  c. $n - 1$  d. $n + 1$ 

The correct answer is:

 $n - 1$ **Question 12**

Correct

Mark 1.00 out  
of 1.00Flag  
question

Why is the Vandermonde matrix generally not used to find the interpolating polynomial?

Select one:

- a. It is too slow
- b. It is sensitive to Runge's phenomenon.
- c. The coefficients of higher powers of  $x$  are sensitive to round-off error ✓
- d. It doesn't give the correct result.

The correct answers are: The coefficients of higher powers of  $x$  are sensitive to round-off error, It is too slow

**Question 13**

Correct

Mark 1.00 out  
of 1.00Flag  
question

When finding an interpolating function using quadratics splines, what is the first condition our splines must satisfy?

Select one:

- a. Each spline must be a linear combination of the others
- b. The splines must be linearly independent
- c. Each spline must pass through every data point
- d. Each spline must pass through the data points at the ends of the interval on which it is defined ✓

The correct answer is: Each spline must pass through the data points at the ends of the interval on which it is defined

**Question 14**

Correct

Mark 1.00 out  
of 1.00Flag  
question

When finding an interpolating function using quadratics splines, what is the second condition our splines must satisfy?

Select one:

- a. Every coefficient must be non-zero
- b. They must form the convolution matrix

- c. They must be accessible from the data
- d. The first derivatives of adjacent splines must agree at the knot they both touch ✓

The correct answer is: The first derivatives of adjacent splines must agree at the knot they both touch

**Question 15**

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following is a problem with interpolating using linear splines?

Select one:

- a. The interpolating function cannot estimate a step function
- b. The interpolating function is not continuous at the knots
- c. The interpolating function is a step function
- d. The interpolating function is not differentiable at the knots ✓

The correct answer is: The interpolating function is not differentiable at the knots

**Question 16**

Correct

Mark 1.00 out of 1.00

Flag question

Given  $n$  data points, how many unknowns must we find to find an interpolating function using quadratic splines?

Select one:

- a.  $3n$  ✓
- b.  $4n$
- c.  $n$

The correct answer is:

$$3n$$

**Question 17**

Correct

Mark 1.00 out of 1.00

Flag question

Find the correlation coefficient  $r$  of the best fit line for the following data:

$$(0, 1), (2, 11), (4, 20), (6, 15), (8, 18)$$

Select one:

- a. 0.91
- b. 0.82
- c. 0.66
- d. 0.80 ✓

The correct answer is: 0.80

**Question 18**

Correct

Mark 1.00 out of 1.00

Flag question

Find the equation of the best fit line for the following set of data points:

$$(0, 1), (2, 7), (4, 15), (6, 22), (8, 30)$$

Select one:

- a.  $y = 0.4 + 3.65X$  ✓
- b.  $y = 2 + 2.25x$
- c.  $y = 1.11 + 5.23x$
- d.  $y = 0.5 + 3.4x$

The correct answer is:

$$y = 0.4 + 3.65X$$

**Question 19**

Correct

Mark 1.00 out of 1.00

Flag question

Suppose we have the following data:

$$(1, 2), (2, 4.5), (3, 9), (4, 20), (5, 40)$$

We know this data fits an exponential model

$$y = ae^{bx}$$

Using simple linear regression, find the coefficients

a, b

Select one:

a.

$a = 0.91$

$b = 0.67$

b.

$a = 0.93$

$b = 0.71$

c.

$a = 1.01$

$b = 0.56$

d.

$a = 0.97$

$b = 0.75$



The correct answer is:

$a = 0.97$

$b = 0.75$

**Question 20**

Correct

Mark 1.00 out of 1.00

Flag question

Suppose we have the following data:

$$(1, 0.14), (2, 0.2), (3, 0.4), (4, 0.4), (5, 0.6)$$

We know this data fits a saturation growth rate model

$$y = a \frac{x}{x + b}$$

Using simple linear regression, find the coefficients

$a, b$

Select one:

a.

$a = 1.45$

$b = 10.12$

b.

$a = 1.48$

$b = 10.01$

c.

$a = 1.5$

$b = 9.88$

d.

$a = 1.56$

$b = 11.4$

The correct answer is:

$a = 1.48$

$b = 10.01$

**Question 21**

Correct

Mark 1.00 out of 1.00

Flag question

We have data

$$(1, 5), (2, 4), (3, 6), (4, 1)$$

Using this data find the first Lagrange polynomial

$L_1$

for the interpolating cubic and evaluate it at

$$x = 2.5$$

Select one:

- a. -0.0625 ✓
- b. -0.2143
- c. 0.3625
- d. 0.0011

The correct answer is: -0.0625

**Question 22**

Correct

Mark 1.00 out  
of 1.00

Flag  
question

We have data

$$(0, 2), (2, 5), (4, 1), (6, 9)$$

Find the term

$$b_3$$

in Newton's form of the interpolating cubic.

Select one:

- a. 0.267
- b. 0.422
- c. 0.396 ✓
- d. 0.301

The correct answer is: 0.396

**Question 23**

Correct

Mark 1.00 out  
of 1.00

Flag  
question

Given data points

$$x_0 = 1, x_1 = 8, x_2 = 15, y_0 = 9.1, y_1 = 5.2, y_2 = 8.8$$

use linear splines to estimate the value of  $f(x)$  when

$$x = 5.8$$

Give your answer to 1 decimal place.

Answer:  ✓

The correct answer is: 6.4

**Question 24**

Correct

Mark 1.00 out  
of 1.00

Flag  
question

Given data points

$$x_0 = 1, x_1 = 4, x_2 = 7, y_0 = 1, y_1 = 3, y_2 = 2$$

use quadratic splines to estimate the value of  $f(x)$  when

$$x = 5$$

Give your answer to 2 decimal places.

Answer:  ✓

The correct answer is: 3.33

[Finish review](#)

You are logged in as Thanakorn Pasangthien ([Log out](#))  
[611\\_ITCS306](#)