



UNIVERSITAS ISLAM INDONESIA  
FAKULTAS TEKNOLOGI INDUSTRI  
JURUSAN TEKNIK INDUSTRI

UJIAN TENGAH SEMESTER GANJIL  
TAHUN AKADEMIK 2013/2014

$u' = 1-y$

Mata Kuliah/SKS : Kalkulus Peubah Banyak/2 SKS  
Hari/Tanggal : Jumat, 15 November 2013  
Waktu : 90 menit  
Dosen Penguji : Yardin Heidsyam, ST., MBA.

**Ketentuan:**

Tipe soal : Open book, tapi sebaiknya gunakan general rules yang dibeikan pada lembar soal.

Waktu : Hingga batas waktu maksimal pengerjaan yang diperbolehkan.

H 64 K

1. (bobot 20%)

H 46  $u'$  Bila  $f(x, y) = \frac{x-y}{x+y}$  maka carilah:

a)  $\frac{\partial f}{\partial x}$  pada titik (2, -1)

b)  $\frac{\partial f}{\partial y}$  pada titik (2, -1)

Jawaban:

a) -2

b) -4

2. (bobot 20%)

Bila

$$f(x, y) = \begin{cases} \left(\frac{x^2-xy}{x+y}\right) & \text{untuk } (x, y) \neq (0, 0) \\ 0 & \text{untuk } (x, y) = (0, 0) \end{cases}$$

Carilah:

a)  $f_x(0, 0)$

b)  $f_y(0, 0)$

Jawaban:

a) 1

b) 0

3. (Bobot 100%)

Bila  $f(x, y) = (x - y) \sin(3x + 2y)$

Hitunglah:

a)  $f_x(0, \frac{\pi}{3})$  --- jawaban:  $\frac{1}{2}(\pi + \sqrt{3})$

b)  $f_y(0, \frac{\pi}{3})$  --- jawaban:  $\frac{1}{6}(2\pi - 3\sqrt{3})$

c)  $f_{xx}(0, \frac{\pi}{3})$  --- jawaban:  $\frac{3}{2}(\pi\sqrt{3} - 2)$

d)  $f_{yy}(0, \frac{\pi}{3})$  --- jawaban:  $\frac{2}{3}(\pi\sqrt{3} + 3)$

e)  $f_{xy}(0, \frac{\pi}{3})$  --- jawaban:  $\frac{1}{2}(2\pi\sqrt{3} + 1)$

f)  $f_{yx}(0, \frac{\pi}{3})$  --- jawaban:  $\frac{1}{2}(2\pi\sqrt{3} + 1)$

Kesesuaian Materi dengan Silabi	Kesesuaian Bobot dengan Tingkat Kompleksitas	Kelengkapan informasi soal	Catatan perbaikan jika ada *)	Tanda Tangan Validator

$$\frac{\partial f}{\partial y} = \frac{x-1}{x+1} \rightarrow u' = x+1$$

$$3 \cdot (1) - (3) \cdot 3$$

$$(x-1) \cdot (x+1) - (x-1) \cdot (x+1)$$





## General Rules

Function	Derivative of function
$a$	$0$
$x$	$1$
$af'(x)$	$af'(x)$
$f(x) + g(x)$	$f'(x) + g'(x)$
$x^n$	$nx^{n-1}$
$e^x$	$e^x$
$a^x$	$a^x \ln a$
$\ln x$	$\frac{1}{x}$
$[f(x)]^n$	$n[f(x)]^{n-1}f'(x)$
$e^{f(x)}$	$e^{f(x)}f'(x)$
$a^{f(x)}$	$a^{f(x)}f'(x) \ln a$
$\ln f(x)$	$\frac{f'(x)}{f(x)}$
$f(x)g(x)$	$f(x)g'(x) + f'(x)g(x)$
$\frac{f(x)}{g(x)}$	$\frac{g(x)f'(x) - f(x)g'(x)}{g(x)^2}$

1.  $\frac{d}{dx}(C) = 0$
2.  $\frac{d}{dx}u^n = nu^{n-1} \frac{du}{dx}$
3.  $\frac{d}{dx} \sin u = \cos u \frac{du}{dx}$
4.  $\frac{d}{dx} \cos u = -\sin u \frac{du}{dx}$
5.  $\frac{d}{dx} \tan u = \sec^2 u \frac{du}{dx}$
6.  $\frac{d}{dx} \cot u = -\csc^2 u \frac{du}{dx}$
7.  $\frac{d}{dx} \sec u = \sec u \tan u \frac{du}{dx}$
8.  $\frac{d}{dx} \csc u = -\csc u \cot u \frac{du}{dx}$
9.  $\frac{d}{dx} \log_a u = \frac{\log_a e}{u} \frac{du}{dx} \quad a > 0, a \neq 1$
10.  $\frac{d}{dx} \log_e u = \frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}$
11.  $\frac{d}{dx} a^u = a^u \ln a \frac{du}{dx}$
12.  $\frac{d}{dx} e^u = e^u \frac{du}{dx}$
13.  $\frac{d}{dx} \sin^{-1} u = \frac{1}{\sqrt{1-u^2}} \frac{du}{dx}$
14.  $\frac{d}{dx} \cos^{-1} u = -\frac{1}{\sqrt{1-u^2}} \frac{du}{dx}$
15.  $\frac{d}{dx} \tan^{-1} u = \frac{1}{1+u^2} \frac{du}{dx}$
16.  $\frac{d}{dx} \cot^{-1} u = -\frac{1}{1+u^2} \frac{du}{dx}$
17.  $\frac{d}{dx} \sec^{-1} u = \pm \frac{1}{u\sqrt{u^2-1}} \frac{du}{dx} \begin{cases} + \text{ if } u > 1 \\ - \text{ if } u < -1 \end{cases}$
18.  $\frac{d}{dx} \csc^{-1} u = \mp \frac{1}{u\sqrt{u^2-1}} \frac{du}{dx} \begin{cases} - \text{ if } u > 1 \\ + \text{ if } u < -1 \end{cases}$
19.  $\frac{d}{dx} \sinh u = \cosh u \frac{du}{dx}$
20.  $\frac{d}{dx} \cosh u = \sinh u \frac{du}{dx}$
21.  $\frac{d}{dx} \tanh u = \text{sech}^2 u \frac{du}{dx}$
22.  $\frac{d}{dx} \coth u = -\text{csch}^2 u \frac{du}{dx}$
23.  $\frac{d}{dx} \text{sech} u = -\text{sech} u \tanh u \frac{du}{dx}$
24.  $\frac{d}{dx} \text{csch} u = -\text{csch} u \coth u \frac{du}{dx}$
25.  $\frac{d}{dx} \sinh^{-1} u = \frac{1}{\sqrt{1+u^2}} \frac{du}{dx}$
26.  $\frac{d}{dx} \cosh^{-1} u = \frac{1}{\sqrt{u^2-1}} \frac{du}{dx}$
27.  $\frac{d}{dx} \tanh^{-1} u = \frac{1}{1-u^2} \frac{du}{dx}, \quad |u| < 1$
28.  $\frac{d}{dx} \coth^{-1} u = \frac{1}{1-u^2} \frac{du}{dx}, \quad |u| > 1$
29.  $\frac{d}{dx} \text{sech}^{-1} u = \frac{1}{u\sqrt{1-u^2}} \frac{du}{dx}$
30.  $\frac{d}{dx} \text{csch}^{-1} u = -\frac{1}{u\sqrt{u^2+1}} \frac{du}{dx}$





## SOAL UJIAN TENGAH SEMESTER

## KALKULUS PEUBAH BANYAK

Tipe soal: Open book, tapi sebaiknya gunakan general rules yang dibeikan pada lembar soal.

Waktu: Hingga batas waktu maksimal pengerjaan yang diperbolehkan.

1. (bobot 20%)

Bila  $f(x, y) = \frac{x-y}{x+y}$  maka carilah:

- a)  $\frac{\partial f}{\partial x}$  pada titik (2,-1)  
b)  $\frac{\partial f}{\partial y}$  pada titik (2,-1)

Jawaban:

- a) -2  
b) -4

2. (bobot 20%)

Bila  $f(x, y) =$

$$\begin{cases} \left( \frac{x^2 - xy}{x+y} \right) & \text{untuk } (x, y) \neq (0, 0) \\ 0 & \text{untuk } (x, y) = (0, 0) \end{cases}$$

Carilah:

- a)  $f_x(0, 0)$   
b)  $f_y(0, 0)$

Jawaban:

- a) 1  
b) 0

3. (Bobot 100%)

Bila  $f(x, y) = (x - y)\sin(3x + 2y)$

Hitunglah:

- a)  $f_x(0, \frac{\pi}{3})$  ---jawaban:  $\frac{1}{2}(\pi + \sqrt{3})$   
b)  $f_y(0, \frac{\pi}{3})$  ---jawaban:  $\frac{1}{6}(2\pi - 3\sqrt{3})$   
c)  $f_{xx}(0, \frac{\pi}{3})$  ---jawaban:  $\frac{3}{2}(\pi\sqrt{3} - 2)$   
d)  $f_{yy}(0, \frac{\pi}{3})$  ---jawaban:  $\frac{2}{3}(\pi\sqrt{3} + 3)$   
e)  $f_{xy}(0, \frac{\pi}{3})$  ---jawaban:  $\frac{1}{2}(2\pi\sqrt{3} + 1)$   
f)  $f_{yx}(0, \frac{\pi}{3})$  ---jawaban:  $\frac{1}{2}(2\pi\sqrt{3} + 1)$





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1.  $\frac{d}{dx}(C) = 0$

2.  $\frac{d}{dx} x^n = nx^{n-1} \frac{dx}{dx}$

3.  $\frac{d}{dx} \sin u = \cos u \frac{du}{dx}$

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9.  $\frac{d}{dx} \log_a u = \frac{\log_a e}{u} \frac{du}{dx} \quad u > 0, a \neq 1$

10.  $\frac{d}{dx} \log_e u = \frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}$

11.  $\frac{d}{dx} e^u = e^u \frac{du}{dx}$

12.  $\frac{d}{dx} e^x = e^x \frac{dx}{dx}$

13.  $\frac{d}{dx} \sin^{-1} u = \frac{1}{\sqrt{1-u^2}} \frac{du}{dx}$

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27.  $\frac{d}{dx} \tanh^{-1} u = \frac{1}{1-u^2} \frac{du}{dx}, \quad |u| < 1$

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30.  $\frac{d}{dx} \text{csch}^{-1} u = -\frac{1}{u\sqrt{u^2+1}} \frac{du}{dx}$



## UJIAN TENGAH SEMESTER GANJIL TAHUN AKADEMIK 2012/2013

Mata Kuliah  
Prodi  
Waktu  
Hari/tanggal  
Dosen  
Sifat

: Kalkulus Peubah Banyak  
: Teknik Industri  
: 90 menit  
: Selasa, 27 November 2012  
: Dr. Jaka Nugraha, M.Si  
: Open catatan terbatas satu lembar kwarto

Dr. M. Ul, I. Albal, M. E

1. Diberikan  $u = -3i + 2j - k$ ,  $v = i - 4j + 2k$  dan  $w = 2i - j + 3k$ . Hitung
  - a. Panjang vektor  $u$ .
  - b. Sudut yang terbentuk oleh vektor  $v$  dan  $w$
  - c.  $u \cdot (v \times w)$
  - d.  $u \cdot (v + w) \rightarrow u \cdot v + u \cdot w = \begin{pmatrix} -3 \\ 2 \\ -1 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ -4 \\ 2 \end{pmatrix} + \begin{pmatrix} -3 \\ 2 \\ -1 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} -3 \\ -8 \\ -2 \end{pmatrix} + \begin{pmatrix} -6 \\ 5 \\ -3 \end{pmatrix}$
2. Fungsi Vektor  $r(t) = (1 + t^3)i + te^{-t}j + \sin(2t)k$ 
  - a. Carilah  $r'(t)$
  - b. Carilah vektor singgung satuan pada titik dimana  $t = 0$
3. Hitung kecepatan dan percepatan partikel jika diketahui posisi partikel pada saat  $t$  ditentukan oleh  $r(t) = (t^2 + 1)i + t^3j$  pada  $t = 2$
4. Diketahui fungsi  $f(x, y) = xy^2 + \sqrt{25 - x^2 - y^2}$ 
  - a. Tentukan domain dan range
  - b. Gambarkan domainnya
5. Diketahui fungsi  $f(x, y) = xe^{2y} - x^2 - xy + 3$ 
  - a. Carilah turunan parsial  $f_x(x, y)$ ,  $f_y(x, y)$ ,  $f_{xy}(x, y)$ ,  $f_{xx}(x, y)$ ,  $f_{yy}(x, y)$
  - b. Carilah persamaan bidang singgung di titik  $(2, 0, 1)$

$$L = \sqrt{(-1)^2 + (-3)^2 + (-1)^2} = \sqrt{1 + 9 + 1} = \sqrt{11}$$

$$\sqrt{11} = \frac{7\sqrt{6}}{(v+w) \cos \theta}$$

Kesesuaian materi dengan silabi	Kesesuaian bobot dengan tingkat kompleksitas	Kelengkapan informasi soal.	Catatan Perbaikan Jika Ada	Tanda Tangan Validator
~	~	✓		93

$$\sqrt{11} = \frac{7\sqrt{6}}{\begin{pmatrix} 3 \\ -5 \\ 5 \end{pmatrix} \cdot \cos \theta}$$