PRAKTIKUM METODE NUMERIK

(Tugas 1)

Disusun Oleh:

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PROGRAM STUDI S-1 TEKNIK INFORMATIKA

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

UNIVERSITAS PADJADJARAN

JATINANGOR

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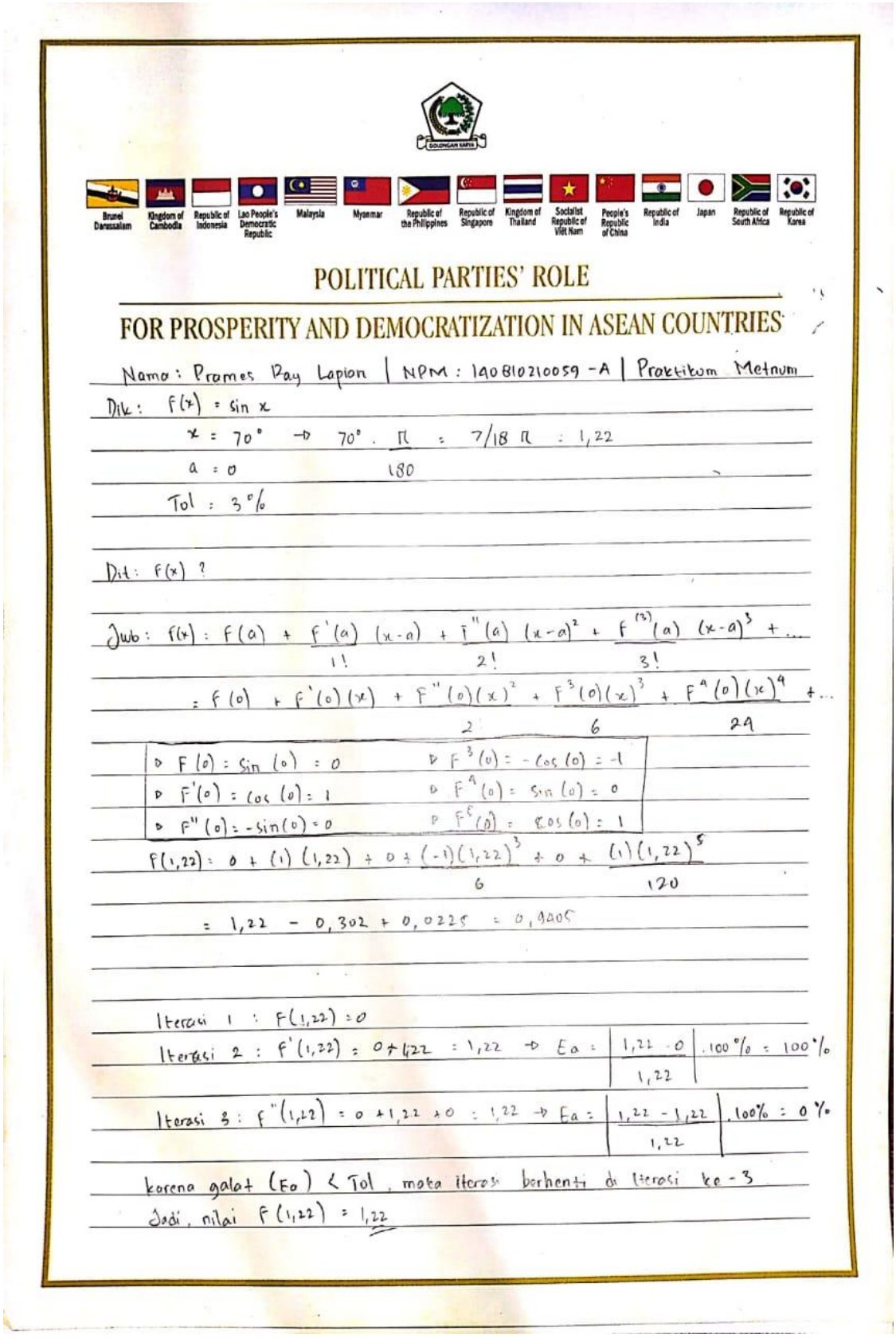
1. Manual:



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POLITICAL PARTIES' ROLE

FOR PROSPERITY AND DEMOCRATIZATION IN ASEAN COUNTRIES

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Dik : $f(x) = \sin x$

$x = 70° \rightarrow 70° \cdot \frac{\pi}{180} = 7/18\ \pi = 1,22$

$a = 0$

Tol : 3 %

Dit : $f(x)$?

Jwb : $f(x) = f(a) + \frac{f'(a)}{1!}(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \frac{f^{(3)}(a)}{3!}(x-a)^3 + \dots$

$= f(0) + f'(0)(x) + \frac{f''(0)(x)^2}{2} + \frac{f^3(0)(x)^3}{6} + \frac{f^4(0)(x)^4}{24} + \dots$

- $f(0) = \sin(0) = 0$
- $f'(0) = \cos(0) = 1$
- $f''(0) = -\sin(0) = 0$
- $f^3(0) = -\cos(0) = -1$
- $f^4(0) = \sin(0) = 0$
- $f^5(0) = \cos(0) = 1$

$f(1,22) = 0 + (1)(1,22) + 0 + \frac{(-1)(1,22)^3}{6} + 0 + \frac{(1)(1,22)^5}{120}$

$= 1,22 - 0,302 + 0,0225 = 0,9205$

Iterasi 1 : $F(1,22) = 0$

Iterasi 2 : $f'(1,22) = 0 + 1,22 = 1,22 \rightarrow Ea = \left|\frac{1,22 - 0}{1,22}\right| \cdot 100\ \% = 100\ \%$

Iterasi 3 : $f''(1,22) = 0 + 1,22 + 0 = 1,22 \rightarrow Ea = \left|\frac{1,22 - 1,22}{1,22}\right| \cdot 100\ \% = 0\ \%$

karena galat (Ea) < Tol, maka iterasi berhenti di iterasi ke - 3

Jadi, nilai $f(1,22) = 1,22$

2. Program:
    a. Fungsi mencari banyak iterasi:

```
function hasil = iterasi(x)
    tol= (10^-6) / 100;
    it = 2;
    temp = 10;
    while temp > tol
        if(modulo(it, 2) == 0) then
            temp = galat(it, x);
        end
        it = it+1;
    end
    hasil = it-1;
endfunction
```

```
--> iterasi(sin(1.22))
 ans  =

   14.
```

    b. Fungsi mencari galat approksimal:

```
function hasil = galat(n, x)
    hasil = abs((taylor(n+1, x) - taylor(n,x)) / taylor(n+1,x))
* 100;
endfunction
```

```
--> galat(14, sin(1.22))
 ans  =

   1.608D-09
```

    c. Fungsi mencari Deret Taylor pada f(x):

```
function hasil = taylor(n, x)
    hasil=0;
    for i=0:n
        if(modulo(i+1, 4) == 0) then
            hasil = hasil - (1.22^  i) / factorial(i);
        else if(modulo(i+1, 2) == 0) then
            hasil = hasil + (1.22^i) / factorial(i);
            end
        end
    end
endfunction
```

```
--> taylor(14, sin(1.22))
 ans  =

   0.9390994
```