

## TUGAS PRAKTIKUM VIII METODE NUMERIK

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Pendidikan Matematika Swadana (D)

FMIPA, UNY

Akan dicari  $P(x)$  dan  $P(c)$  dengan Metode Polinomial Newton jika diketahui :

$$a. \quad a_1 = 4, a_2 = -1, a_3 = 0.4, a_4 = 0.01, a_5 = -0.02$$

$$x_1 = 1, x_2 = 3, x_3 = 4, x_4 = 4.5, c = 2.5$$

**Perintah dalam Matlab :**

```
>> syms z;
>> a=[4 -1 0.4 0.01 -0.02];
>> x=[1 3 4 4.5];
>> k=length(a);
>> p=a(1);
>> for j=2:k,
p=p+a(j)*prod(z-x(1:j-1));
end
>> p
p =
(2*(z - 1)*(z - 3))/5 - z + ((z - 1)*(z - 3)*(z - 4))/100 - ((z - 1)*(z - 3)*(z - 4)*(z -
9/2))/50 + 5
>> simplify(p)
ans =
(13*z^3)/50 - z^4/50 - (39*z^2)/50 - (23*z)/50 + 5
>> p=[-1/50 13/50 -39/50 -23/50];
>> v=polyval(p,2.5)
```

$$v = -1.0975$$

Jadi dapat disimpulkan  $P(x)$  adalah:

$$P(x) = -\frac{1}{50}z^4 + \frac{13}{50}z^3 - \frac{39}{50}z^2 - \frac{23}{50}z + 5$$

Untuk  $c=2,5 \rightarrow$  diperoleh  $P(c) = -1.0975$

$$b. \quad a_1 = 5, a_2 = -2, a_3 = 0.5, a_4 = -0.1, a_5 = -0.003$$
$$x_1 = 0, x_2 = 1, x_3 = 2, x_4 = 3, c = 2.5$$

Perintah dalam Matlab :

```
>> syms z;
>> a=[5 -2 0.5 -0.1 -0.003];
>> x=[0 1 2 3];
>> k=length(a);
>> p=a(1);
>> for j=2:k,
p=p+a(j)*prod(z-x(1:j-1));
end
>> p
p =
(z*(z - 1))/2 - 2*z - (z*(z - 1)*(z - 2))/10 - (3*z*(z - 1)*(z - 2)*(z - 3))/1000 + 5
>> simplify(p)
ans =
(767*z^2)/1000 - (41*z^3)/500 - (3*z^4)/1000 - (1341*z)/500 + 5
>> p=[-3/1000 -41/500 767/1000 -1341/500];
>> v=polyval(p,2.5)
v =
-1.3239
```

Jadi dapat disimpulkan  $P(x)$  yaitu:

$$P(x) = -\frac{3}{1000}z^4 - \frac{41}{500}z^3 + \frac{767}{1000}z^2 - \frac{1341}{500}z + 5$$

Untuk  $c=2,5 \rightarrow$  diperoleh  $P(c) = -1.3239$

c.  $a_1 = 7, a_2 = 3, a_3 = 0.1, a_4 = 0.05, a_5 = -0.004$

$x_1 = -1, x_2 = 0, x_3 = 4, x_4 = 4, c = 3$

**Perintah dalam Matlab**

```
>> syms z;
>> a=[7 3 0.1 0.05 -0.004];
>> x=[-1 0 4 4];
>> k=length(a);
>> p=a(1);
>> for j=2:k,
p=p+a(j)*prod(z-x(1:j-1));
end
>> p
p =
3*z + (z*(z + 1))/10 + (z*(z + 1)*(z - 4))/20 - (z*(z + 1)*(z - 4)^2)/250 + 10
>> simplify(p)
ans =
(39*z^3)/500 - z^4/250 - (41*z^2)/500 + (709*z)/250 + 10
>> p=[-1/25 33/100 -37/100 113/50];
>> v=polyval(p,3)
v =
3.0400
```

Jadi dapat disimpulkan  $P(x)$  yaitu:

$$P(x) = -\frac{1}{25}z^4 + \frac{33}{100}z^3 - \frac{37}{100}z^2 + \frac{113}{50}z + 10$$

Untuk  $c=3 \rightarrow$  diperoleh  $P(c) = 3.0400$

d.  $a_1 = -2, a_2 = 4, a_3 = -0.04, a_4 = 0.06, a_5 = 0.005$

$x_1 = -3, x_2 = -1, x_3 = 1, x_4 = 4, c = 2$

### Perintah dalam Matlab

```
>> syms z;
>> a=[-2 4 -0.04 0.06 0.005];
>> x=[-3 -1 1 4];
>> k=length(a);
>> p=a(1);
>> for j=2:k,
p=p+a(j)*prod(z-x(1:j-1));
end
>> p
p =
4*z - ((z + 1)*(z + 3))/25 + (3*(z - 1)*(z + 1)*(z + 3))/50 + ((z - 1)*(z + 1)*(z +
3)*(z - 4))/200 + 10
>> simplify(p)
ans =
z^4/200 + (11*z^3)/200 + (3*z^2)/40 + (757*z)/200 + 244/25
>> p=[1/200 11/200 3/40 757/200];
>> v=polyval(p,2)
v =
4.1950
```

Jadi dapat disimpulkan  $P(x)$  yaitu:

$$P(x) = \frac{1}{200}z^4 + \frac{11}{200}z^3 + \frac{3}{40}z^2 + \frac{757}{200}z + \frac{244}{25}$$

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**Untuk  $c=2 \rightarrow$  diperoleh  $P(c) = 4.1950$**

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