

PROBABILITAS DAN STATISTIKA

DISTRIBUSI UNIFORM DISKRIT

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Distribusi Uniform Diskrit

Variabel acak diskrit X dengan nilai-nilai x_1, x_2, \dots, x_n berdistribusi uniform diskrit apabila variabel acak X mempunyai fungsi massa probabilitas

$$p_i = p(x_i) = P(X = x_i) = \frac{1}{n} \quad i = 1, 2, \dots, n$$

Tampak
$$\sum_{i=1}^n p_i = \frac{1}{n} + \frac{1}{n} + \dots + \frac{1}{n} = n \frac{1}{n} = 1$$

Mean dan Variansi Distribusi Uniform Diskrit

Bila variabel acak diskrit X dengan nilai-nilai x_1, x_2, \dots, x_n berdistribusi uniform diskrit dengan fungsi massa probabilitas

$$p_i = p(x_i) = P(X = x_i) = \frac{1}{n} \quad i = 1, 2, \dots, n$$

maka mean distribusi uniform diskrit ini

$$EX = \mu = \frac{1}{n} \sum_{i=1}^n x_i = \frac{a+b}{2} = a + \frac{n-1}{2}$$

dan variansinya

$$VX = \sigma^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \mu)^2 = \frac{1}{n} \sum_{i=1}^n (x_i)^2 - \mu^2 = \frac{n^2 - 1}{12} = \frac{(b - a + 1)^2 - 1}{12}$$

Contoh 5.1

Permintaan sedan jenis tertentu per bulan berdistribusi uniform diskrit

$n := 5$ $i := 1..n$

$i =$	$x_i =$
1	0
2	1
3	2
4	3
5	4

$n = 5$

$a := x_1$

$a = 0$

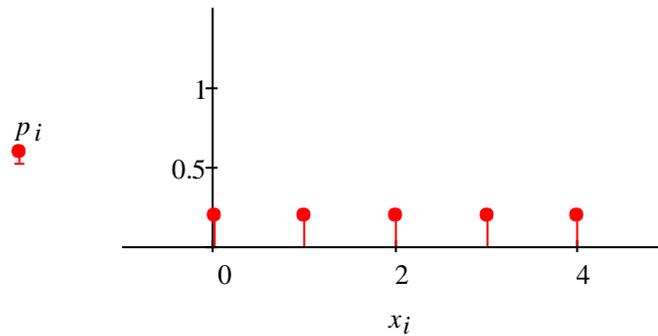
$b := x_n$

$b = 4$

$p_i := \frac{1}{n}$

Fungsi massa probabilitas

$i =$	$p_i =$
1	0.2
2	0.2
3	0.2
4	0.2
5	0.2

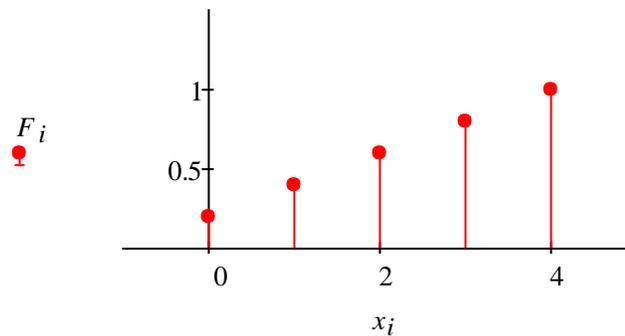


Gambar Fungsi massa probabilitas

$F_i := \sum_{k=1}^i p_k$

Fungsi kumulatif

$i =$	$F_i =$
1	0.2
2	0.4
3	0.6
4	0.8
5	1



Gambar Fungsi kumulatif

$$EX := \frac{1}{2} (a + b)$$

Mean distribusi uniform diskrit

$$EX = 2$$

$$VX := \frac{n^2 - 1}{12}$$

Variansi distribusi uniform diskrit

$$VX = 2$$

Contoh 5.2

Pemakaian komputer per harinya berdistribusi uniform diskrit

$$n := 10$$

$$i := 1..n$$

$i =$

1
2
3
4
5
6
7
8
9
10

$x_i =$

0
1
2
3
4
5
6
7
8
9

$$n = 10$$

$$a := x_1$$

$$a = 0$$

$$b := x_n$$

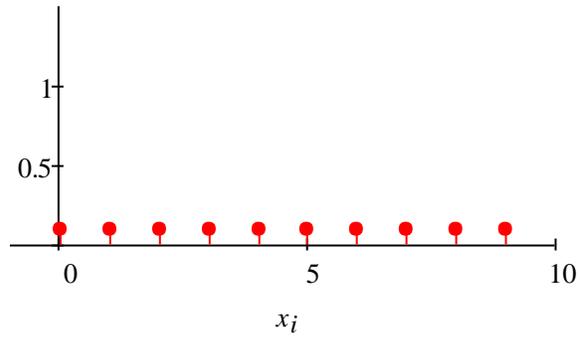
$$b = 9$$

$$p_i := \frac{1}{n}$$

Fungsi massa probabilitas

$i =$	$p_i =$
1	0.1
2	0.1
3	0.1
4	0.1
5	0.1
6	0.1
7	0.1
8	0.1
9	0.1
10	0.1

p_i

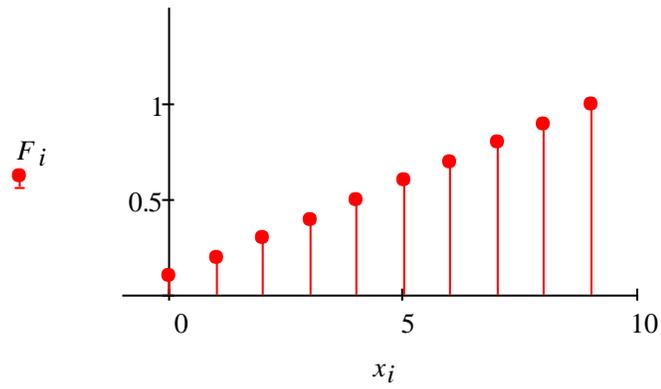


Gambar Fungsi massa probabilitas

$$F_i := \sum_{k=1}^i p_k$$

Fungsi kumulatif

$i =$	$F_i =$
1	0.1
2	0.2
3	0.3
4	0.4
5	0.5
6	0.6
7	0.7
8	0.8
9	0.9
10	1



Gambar Fungsi kumulatif

$$EX := \frac{1}{2} (a + b)$$

Mean distribusi uniform diskrit

$$EX = 4.5$$

$$VX := \frac{n^2 - 1}{12}$$

Variansi distribusi uniform diskrit

$$VX = 8.25$$