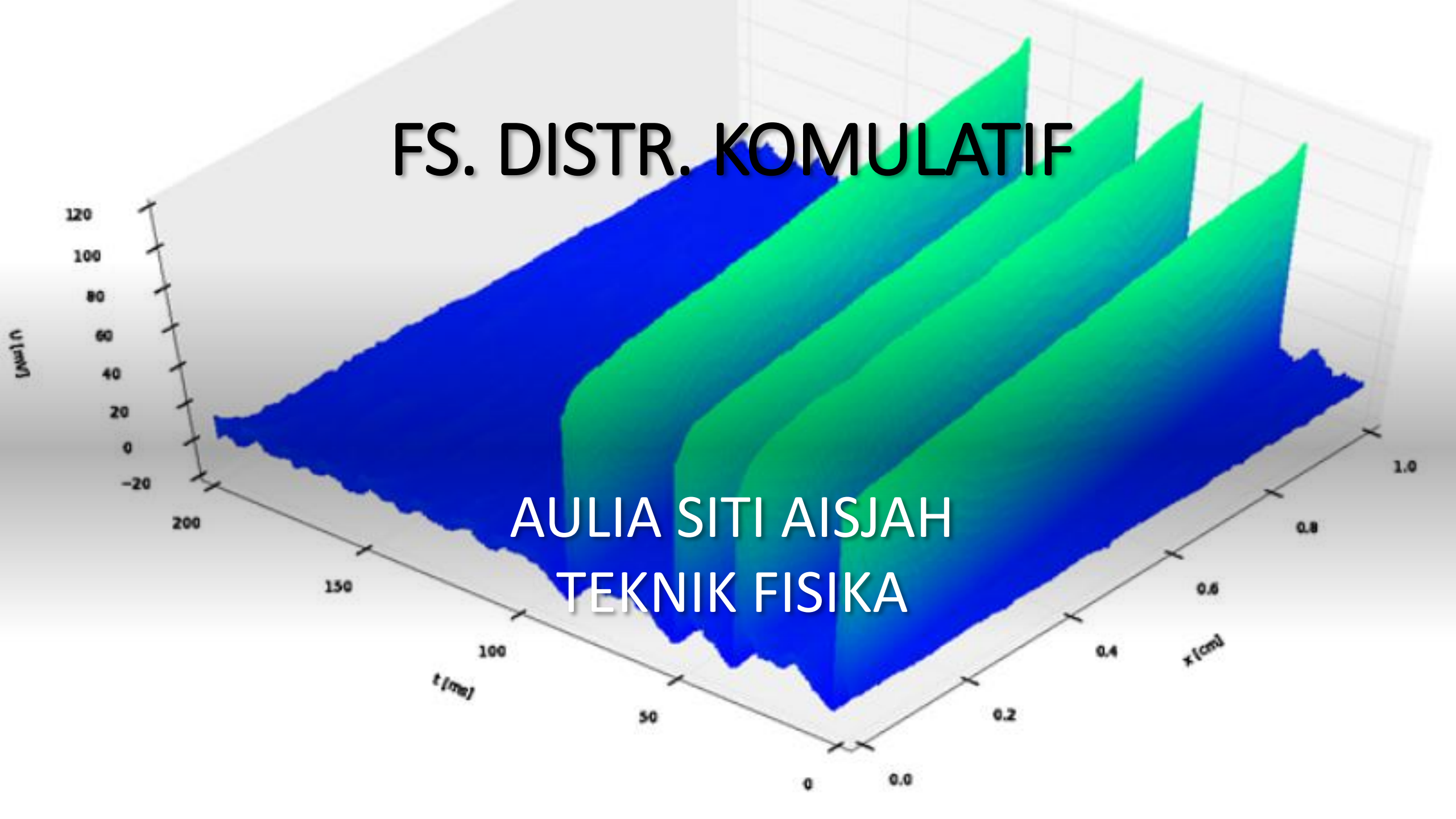
FS. DISTR. KOMULATIF



AULIA SITI AISJAH
TEKNIK FISIKA

Fs. Distribusi Komulatif

Capaian Pembelajaran:

Mampu menentukan besarnya fungsi distribusi komulatif dan mampu menentukan karakteristik variable acak dengan menggunakan operator E

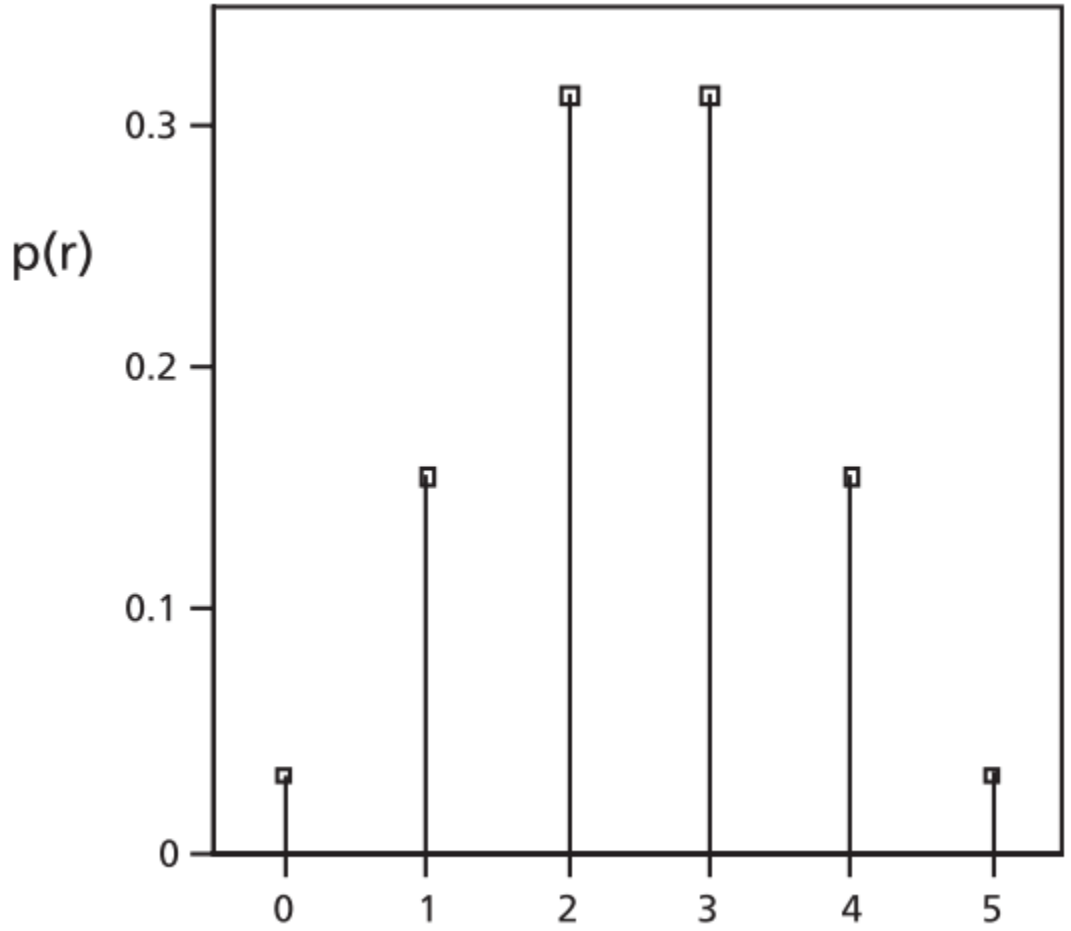
Kajian:

1. Definisi Fs Distribusi Komulatif
2. Penentuan besarnya Fs Distribusi Komulatif
3. Sifat Fs Distribusi Komulatif

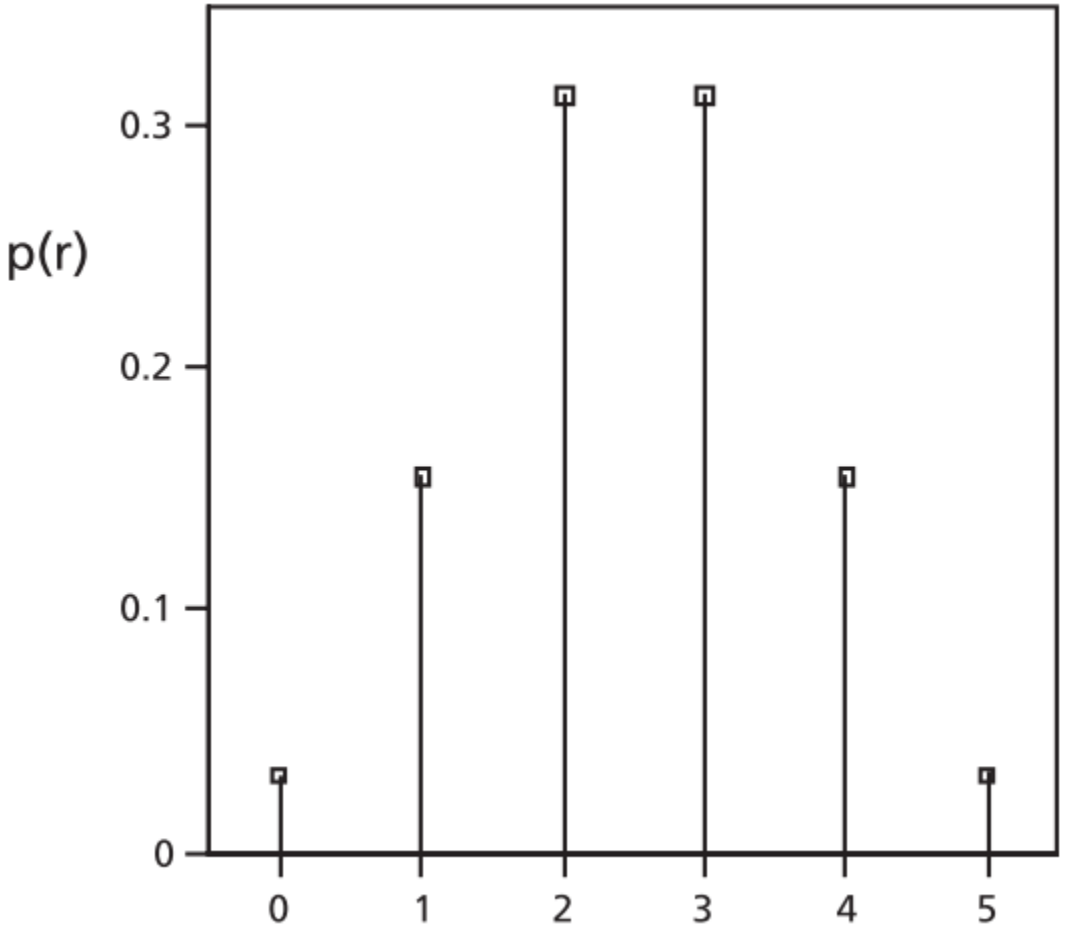
Contoh

Pelemparan 5 kali uang koin

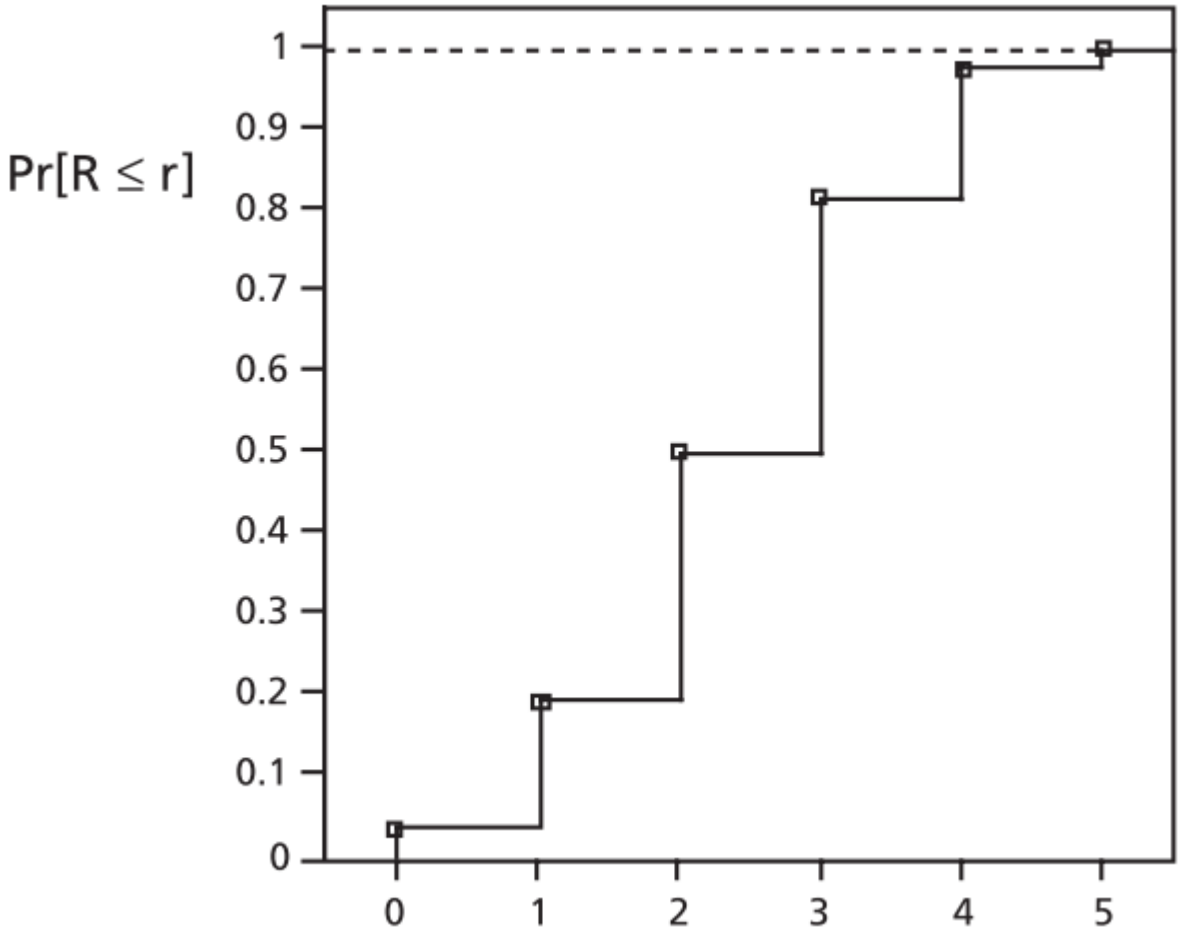
Munculnya A	Probability, p(r)
0	$\frac{1}{32}$
1	$\frac{5}{32}$
2	$\frac{10}{32}$
3	$\frac{10}{32}$
4	$\frac{5}{32}$
5	$\frac{1}{32}$
Total	1



Fs Distribusi Probabilitas



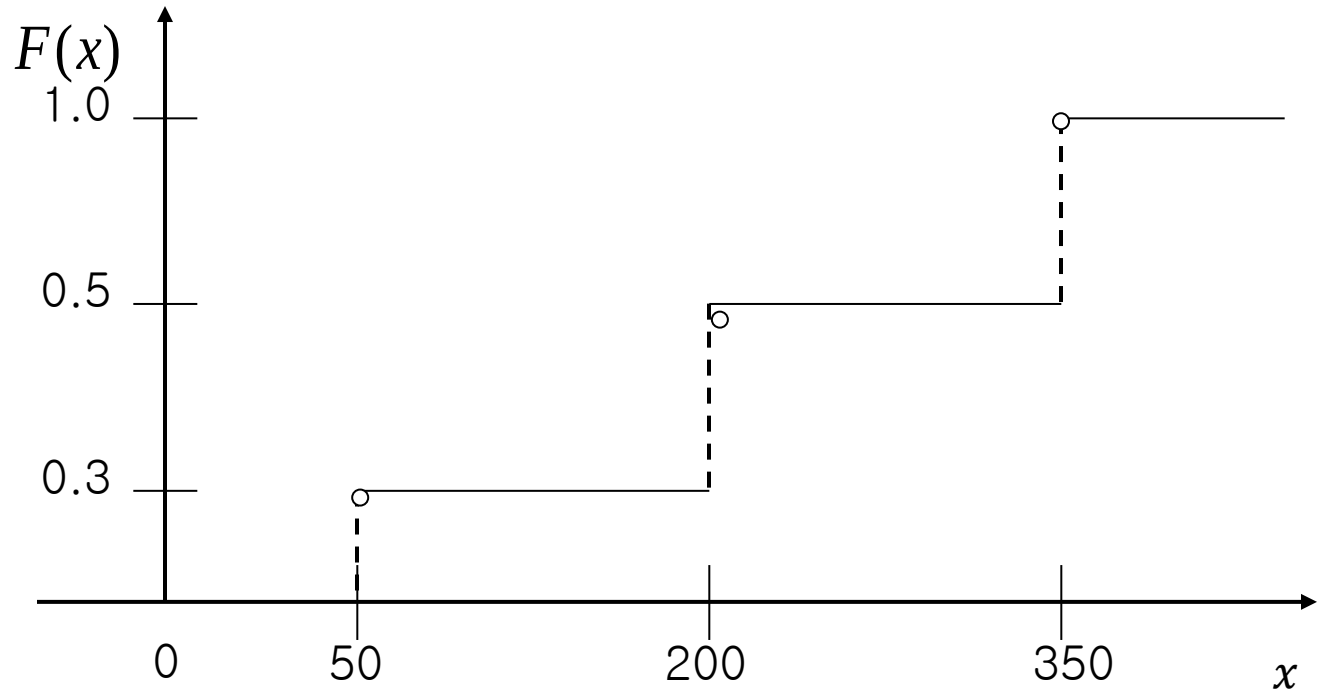
Fs Komulatif Probabilitas



X = jumlah munculnya A dalam pelemparan koin 5 kali

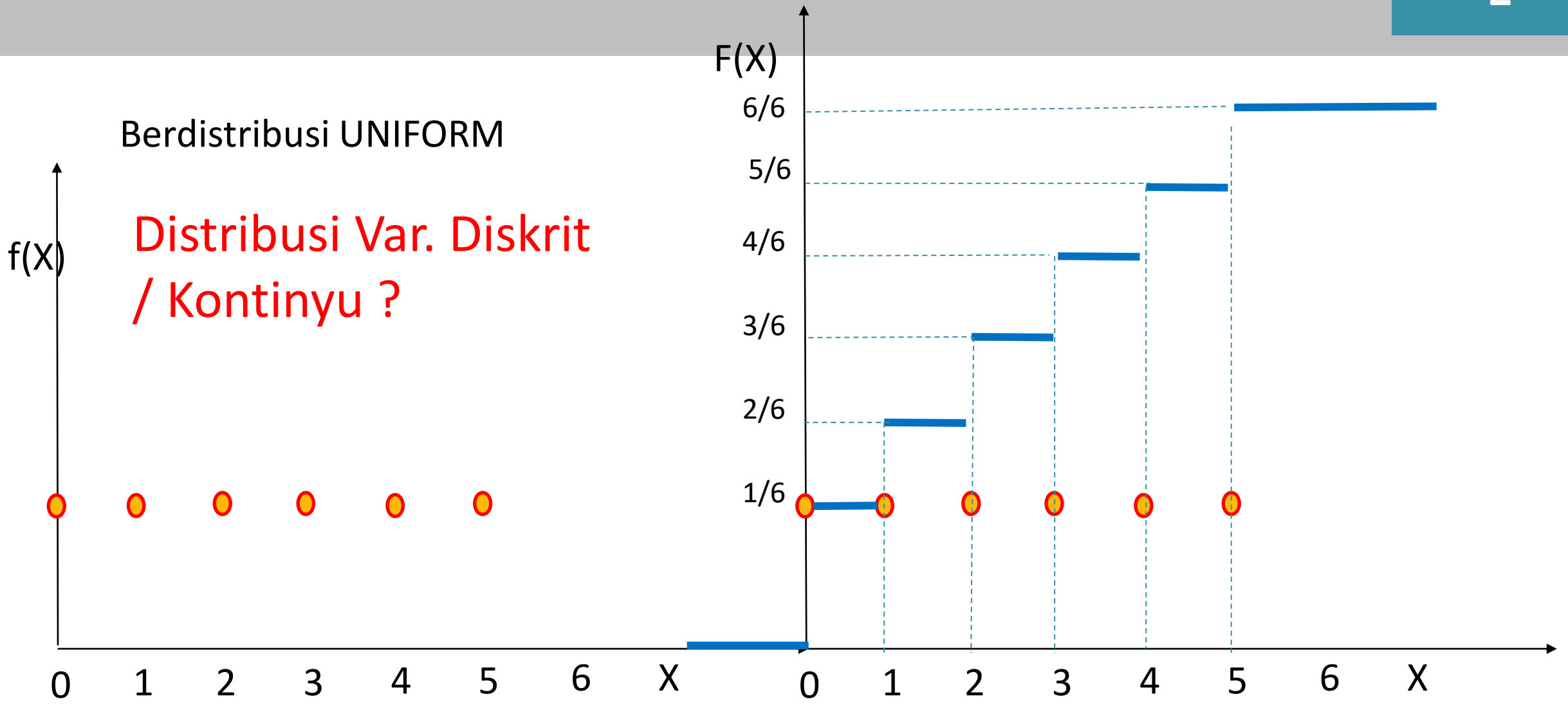
Fs. Komulatif

$$F(x) = P(X \leq x) \qquad F(x) = \sum_{y:y \leq x} P(X = y)$$



Berdistribusi UNIFORM

Distribusi Var. Diskrit / Kontinyu ?



Contoh distr. komulatif

$-\infty < x < 50 \Rightarrow F(x) = P(\text{biaya} \leq x) = 0$
$50 \leq x < 200 \Rightarrow F(x) = P(\text{biaya} \leq x) = 0.3$
$200 \leq x < 350 \Rightarrow F(x) = P(\text{biaya} \leq x) = 0.3 + 0.2 = 0.5$
$350 \leq x < \infty \Rightarrow F(x) = P(\text{biaya} \leq x) = 0.3 + 0.2 + 0.5 = 1.0$

$$F(x) = \sum_{x_j \leqq x} f(x_j) = \sum_{x_j \leqq x} p_j$$

Contoh

Pabrik yang Produksi mur - baut

- Misalkan variable acak X merupakan ukuran diameter dari mur – (bentuk silinder).
- Pabrik mengumumkan kpd konsumen bahwa spesifikasi dari produknya berdiameter antara 49.5 and 50.5 mm,
- Termasuk variable acak apa?

Fs distribusi probabilitas

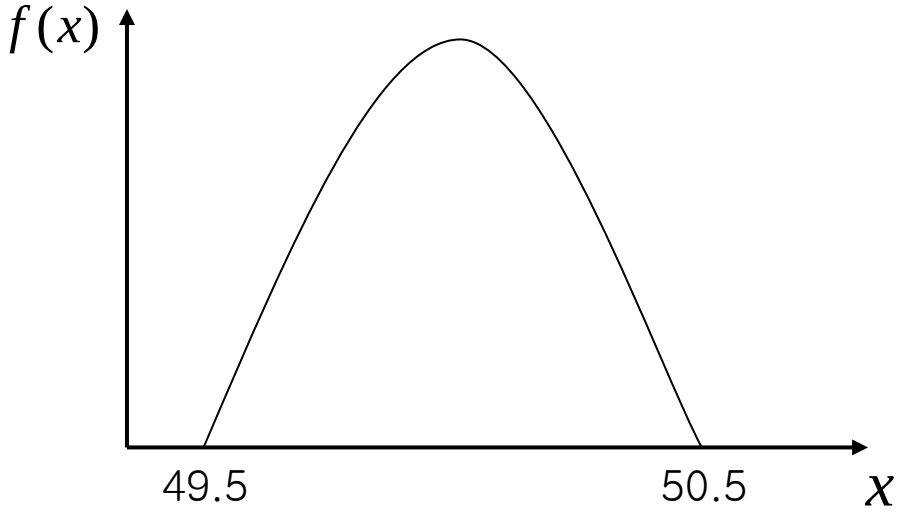
- Variabel acak kontinyu

$$f(x) \geq 0$$

$$\int_{statespace} f(x)dx = 1$$

Fs distribusi probabilitas

- Contoh diameter silinder dari mur produk pabrik A



$$f(x) = 1.5 - 6(x - 50.2)^2 \text{ untuk } 49.5 \leq x \leq 50.5$$
$$f(x) = 0, \text{ yg lain}$$

Fungsi kerapatan probabilitas (density function)

Untuk contoh produk mur – diameter

Besarnya probabilitas diameter yang berukuran di antara 49.5 sd 50.5 mm

$$\int_{49.5}^{50.5} (1.5 - 6(x - 50.0)^2)dx = [1.5x - 2(x - 50.0)^3]_{49.5}^{50.5}$$

$$= [1.5 \times 50.5 - 2(50.5 - 50.0)^3]$$

$$- [1.5 \times 49.5 - 2(49.5 - 50.0)^3]$$

$$= 75.5 - 74.5 = 1.0$$

Fungsi kerapatan probabilitas (density function)

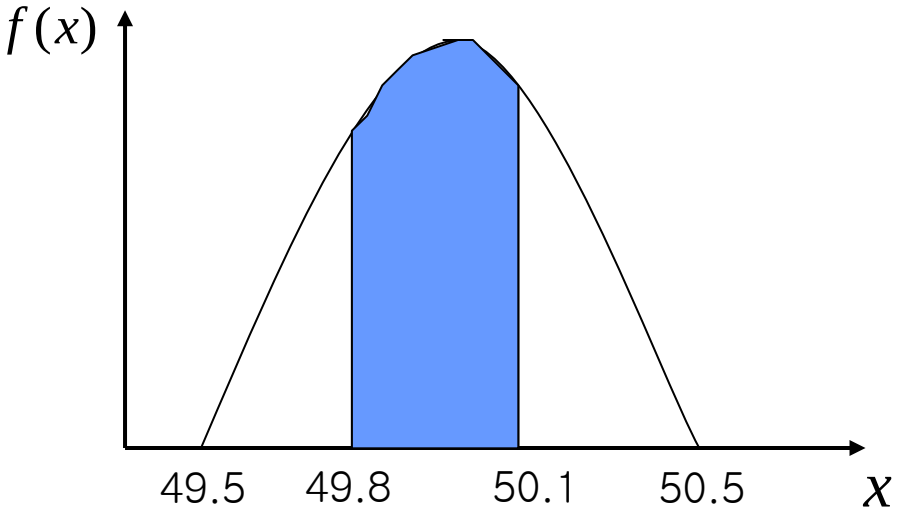
- Dapat digunakan untuk menentukan besarnya probabilitas pabrik memproduksi mur dengan diameter diantara 49.8 -50.1 mm

$$\int_{49.8}^{50.1}(1.5-6(x-50.0)^2)dx=[1.5x-2(x-50.0)^3]_{49.8}^{50.1}$$

$$=[1.5\times 50.1-2(50.1-50.0)^3]$$

$$-[1.5\times 49.8-2(49.8-50.0)^3]$$

$$=75.148-74.716=0.432$$



Distribusi Probabilitas komulatif

1. $F(x) = P(X \le x) = \int_{-\infty}^{x} f(y)dy$

2. $f(x) = \frac{dF(x)}{dx}$

3. $P(a < X \le b) = P(X \le b) - P(X \le a)$

$= F(b) - F(a)$

$P(a \le X \le b) = P(a < X \le b)$

Distribusi Probabilitas komulatif

Contoh

$$F(x) = P(X \le x) = \int_{49.5}^{x} (1.5 - 6(y - 50.0)^2) dy$$

$$= [1.5y - 2(y - 50.0)^3]_{49.5}^{x}$$

$$= [1.5x - 2(x - 50.0)^3] - [1.5 \times 49.5 - 2(49.5 - 50.0)^3]$$

$$= 1.5x - 2(x - 50.0)^3 - 74.5$$

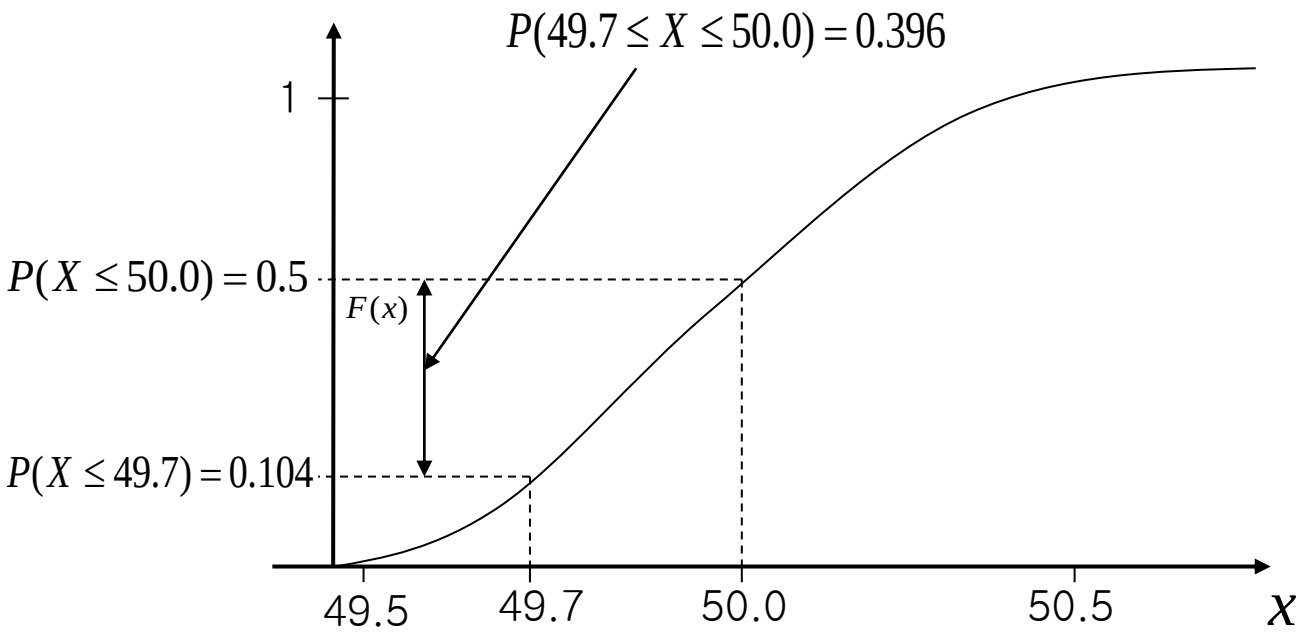
$$P(49.7 \le X \le 50.0) = F(50.0) - F(49.7)$$

$$= (1.5 \times 50.0 - 2(50.0 - 50.0)^3 - 74.5)$$

$$-(1.5 \times 49.7 - 2(49.7 - 50.0)^3 - 74.5)$$

$$= 0.5 - 0.104 = 0.396$$

Distribusi Probabilitas komulatif



Catat semua Informasi tambahan dari perkuliahan – online

Terimakasih