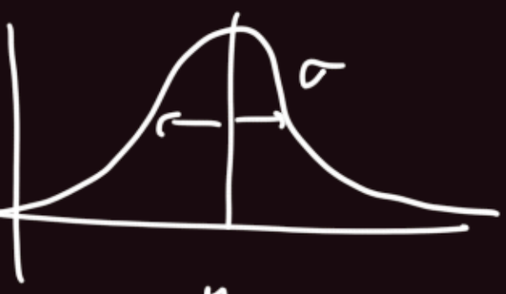
La Normale

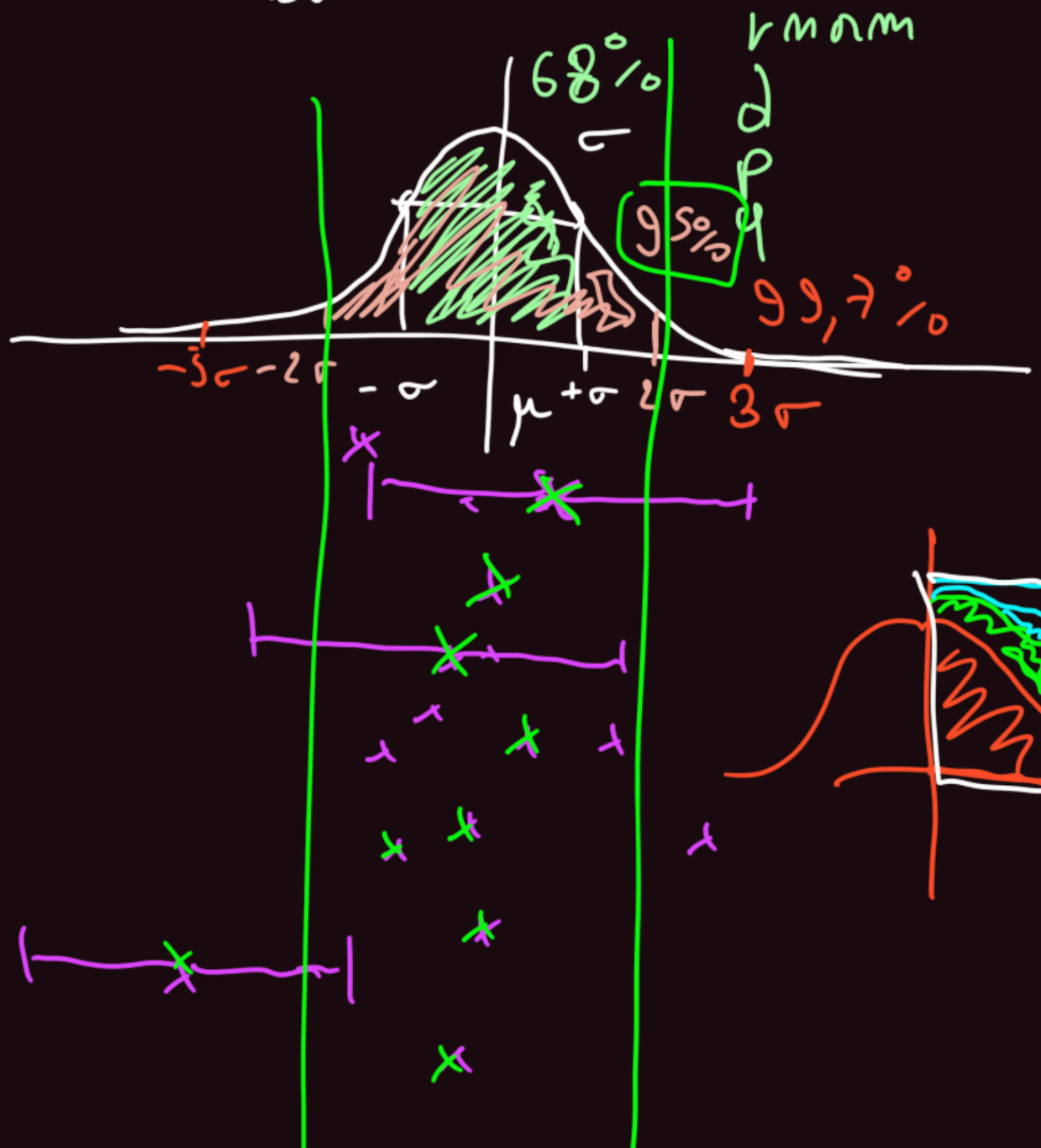
$$\frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}} \qquad \mu, \sigma$$

$\mathbb{E} = \mu$

$V = \sigma^2$



- Reset
- Propriétés, TCL, Vecteurs
  - Σ
  - Box Müller



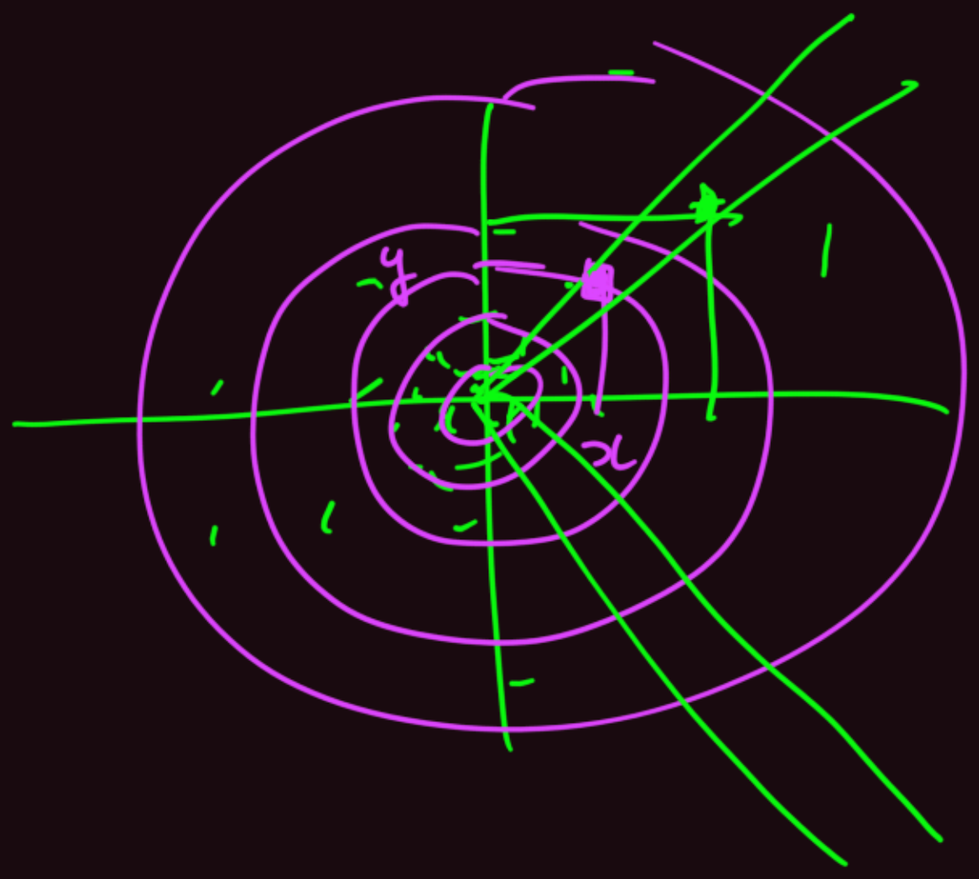
$X \sim \mathcal{L}$ t.q $\mathbb{E}(X) = \mu$ $V(X) = \sigma^2$

$X_1, \dots, X_n$ i.i.d

$$\frac{X_1 + \dots + X_n}{n} \underset{n \to +\infty}{\sim} \mathcal{N}\left(\mu, \frac{\sigma^2}{n}\right)$$

$\frac{n\sigma^2}{n^2}$ $\frac{\sigma^2}{n}$

$\frac{\sigma}{\sqrt{n}}$



BOX MULLER

$$e^{-x^2} \times e^{-y^2}\, dx\, dy$$

$$e^{-\frac{1}{2}(x^2+y^2)} \quad r^2 \qquad r \cdot dr \cdot d\theta$$

$$\int_0^{R_2} e^{-\frac{r^2}{2}}\, dR_2 \int d\theta$$

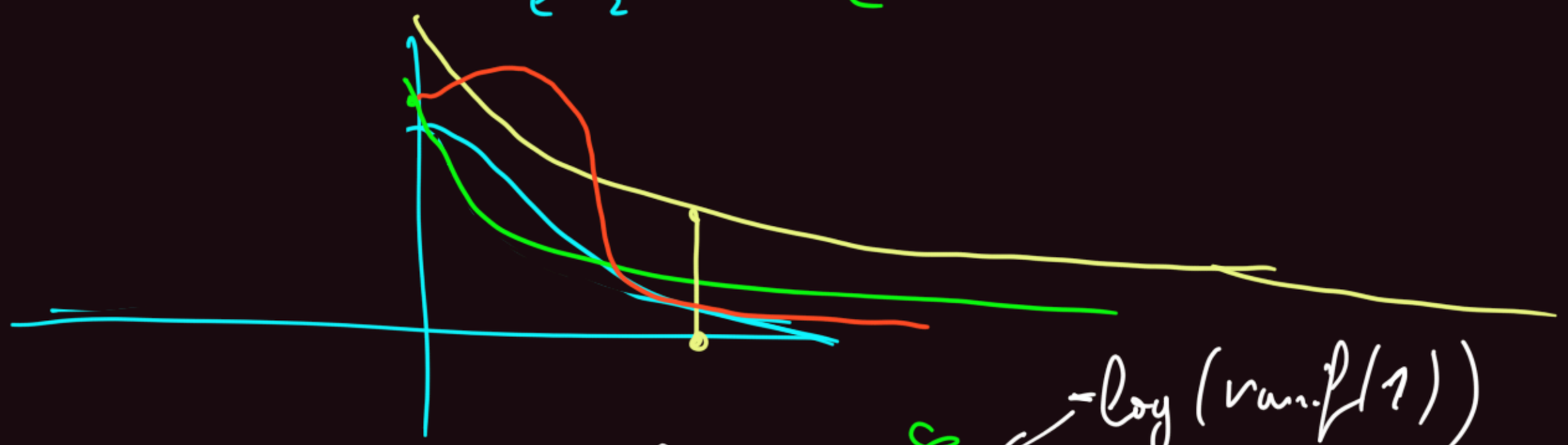
$$\Theta \sim U[0, 2\pi]$$

$$R_2 \sim \mathcal{E}$$

$$X = \sqrt{R_2}\cos\Theta$$

$$Y = \sqrt{R_2}\sin\Theta$$

17
12



$-\log(\text{runif}(1))$

```
mygeom = function(){
  x ~ E
  y ~ U[0, M*e^-x]
  if(y <= e^(-x^2/2)) return x
}
return()
```

$e^{-\frac{x^2}{2}} \le M e^{-x}$ break condition

```
{ if(runif <= 0,5) return(x)
  else return(-x)
}
```