

# VARIABILE ALEATORIA

numero di teste ottenute in un lancio

$$X = \left\{ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ \frac{1}{8} & \frac{3}{8} & \frac{3}{8} & \frac{1}{8} \end{array} \right\}$$

CASI POSSIBILI

TTT  
TTC  
TCT  
TCC  
CTT  
CTC  
CCT  
CCC

$$M(X) = 0 \cdot \frac{1}{8} + 1 \cdot \frac{3}{8} + 2 \cdot \frac{3}{8} + 3 \cdot \frac{1}{8} = \frac{12}{8} = \frac{3}{2}$$

Scarti

$$X' = \left\{ \begin{array}{cccc} -\frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{3}{2} \\ \frac{1}{8} & \frac{3}{8} & \frac{3}{8} & \frac{1}{8} \end{array} \right\}$$

Valori della  
variabile meno la media

Q cui si associano le stesse probabilità

la media degli  
scarti è SEMPRE = 0

$$M(X') = -\frac{3}{2} \cdot \frac{1}{8} - \frac{1}{2} \cdot \frac{3}{8} + \frac{1}{2} \cdot \frac{3}{8} + \frac{3}{2} \cdot \frac{1}{8} = 0$$

VARIANZA: media degli scarti al quadrato.

$$\text{VAR}(X) = M((X')^2) = \frac{9}{4} \cdot \frac{1}{8} + \frac{1}{4} \cdot \frac{3}{8} + \frac{1}{4} \cdot \frac{3}{8} + \frac{9}{4} \cdot \frac{1}{8} = \frac{9+3+3+9}{32} = \frac{24}{32} = \frac{3}{4} = 0,75$$

$$\text{S.d.m.}(X) = \sqrt{\text{VAR}(X)} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2} \approx 0,866$$

## VARIABILE STATISTICA

}	0	1	2	3	}
	$\frac{1}{15}$	$\frac{4}{15}$	$\frac{6}{15}$	$\frac{4}{15}$	

TTC TTT TTC  
TTC TTC CTT  
CTC TTT CTC  
CTC TTC  
TTT TTC  
CTT CTT

$$\text{MEDIA} : 0 \cdot \frac{1}{15} + 1 \cdot \frac{4}{15} + 2 \cdot \frac{6}{15} + 3 \cdot \frac{4}{15} = \frac{4+12+12}{15} = \frac{28}{15} = 1,8\bar{6}$$

## SCARTI

$$X' = \left\{ \begin{array}{cccc} -\frac{28}{15} & -\frac{13}{15} & \frac{2}{15} & \frac{17}{15} \\ \frac{1}{15} & \frac{4}{15} & \frac{6}{15} & \frac{4}{15} \end{array} \right\}$$

## VARIANZA

$$\frac{784}{225} \cdot \frac{1}{15} + \frac{169}{225} \cdot \frac{4}{15} + \frac{4}{225} \cdot \frac{6}{15} + \frac{289}{225} \cdot \frac{4}{15} = \frac{2640}{3375} = \frac{528}{675} \approx 0,78\bar{2}$$

## VARIAB. STATISTICA "DI CLASSE"

}	0	1	2	3	}
	$\frac{22}{130}$	$\frac{52}{130}$	$\frac{48}{130}$	$\frac{8}{130}$	