

ESERCIZIO I

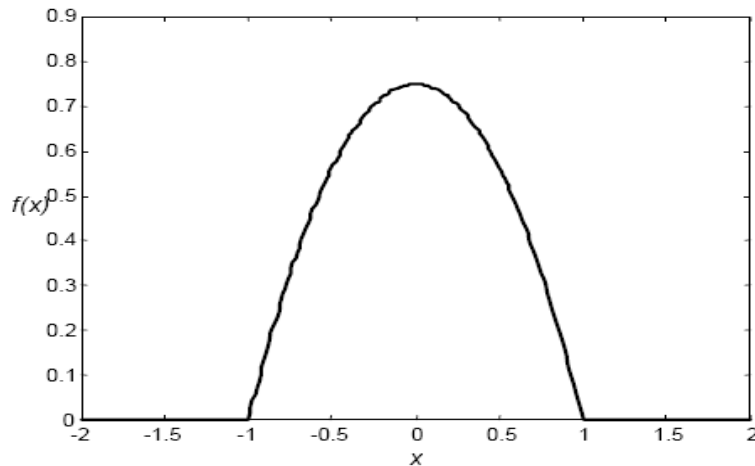
Unità	Sesso	Auto possedute	<i>N. auto</i>					Tot.
			<i>Sesso</i>	0	1	2	3	
1	M	1						
2	M	2						
3	F	1						
4	M	0						
5	F	2						
6	M	1						
7	F	1						
8	F	0						
9	M	3	M_F=	1.625				
10	M	2	M_M=	1.5833				
11	M	2						
12	F	4	M=	1.600	=(1.625*8+1.5833*12)/20			
13	F	3						
14	M	1	M2=	1.923538				
15	F	1						
16	M	2	Var=M2^2-M^2=		1.14		sigma	1.067707825
17	M	3						
18	M	0	Me(auto fra le donne)=				1	
19	F	1						
20	M	2						

ESERCIZIO II

	8.45	8.48	8.51	8.46
Media campionaria=	8.475			
S2_cor=	0.0007			
e.s. media campionaria=		0.013229		
Intervallo di confidenza				
Quantile T	3.182446305			
Intervallo di confidenza				
	8.432900193		8.5171	
Valore test =	35.90662			
Rifiuto decisamente l'ipotesi nulla				

ESERCIZIO III

$$\int_{-\infty}^{\infty} f(x) dx = \int_{-1}^1 \frac{3(1-x^2)}{4} dx = \frac{3}{4} \left| x - \frac{x^3}{3} \right|_{-1}^1 = \frac{3}{4} \left(2 - \frac{2}{3} \right) = 1$$



$f(x)$ è simmetrica intorno alla 0
Quindi
 $E(X) = \text{med}(X) = 0$

$$F(x) = \int_{-\infty}^x f(t) dt.$$

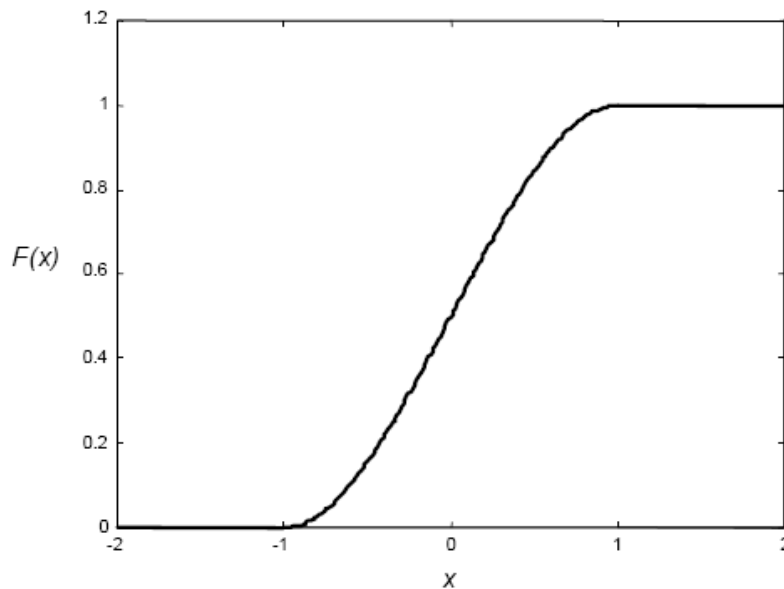
Per $x \leq -1$ $F(x) = 0$

Per $-1 < x < 1$ $F(x) = \int_{-1}^x \frac{3(1-t^2)}{4} dt = \frac{3}{4} \left| t - \frac{t^3}{3} \right|_{-1}^x = \frac{3}{4} \left(-\frac{x^3}{3} + x + \frac{2}{3} \right)$

Per $x \geq 1$ $F(x) = 1$

$$F(x) = \begin{cases} 0 & x \leq -1 \\ \frac{3}{4} \left(-\frac{x^3}{3} + x + \frac{2}{3} \right) & -1 < x < 1 \\ 1 & x \geq 1 \end{cases}$$

$$P\left(X > \frac{1}{4}\right) = 1 - F\left(\frac{1}{4}\right) = 1 - \frac{3}{4}\left(-\frac{1}{3} - \frac{1}{64} + \frac{1}{4} + \frac{2}{3}\right) = \frac{81}{256} \cong 0.3164$$



$$\begin{aligned} \sigma^2 &= \int_{-1}^1 x^2 f(x) dx - \mu^2 = \int_{-1}^1 x^2 \cdot \frac{3(1-x^2)}{4} dx = \frac{3}{4} \int_{-1}^1 (x^2 - x^4) dx = \\ &= \frac{3}{4} \left[\frac{x^3}{3} - \frac{x^5}{5} \right]_{-1}^1 = \frac{3}{4} \left(\frac{1}{3} - \frac{1}{5} + \frac{1}{3} - \frac{1}{5} \right) = \frac{1}{5} \end{aligned}$$

