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ESTADÍSTICA

I. Relación entre consumo de proteínas y masa muscular.

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

$$\bar{x} = \frac{80 + 100 + 90 + 85 + 110 + 95}{6} = 93.33$$

$$\bar{y} = \frac{60 + 65 + 62 + 61 + 67 + 63}{6} = 63$$

X	y	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
80	60	-13.33	-3	39.99	177.68	9
100	65	6.67	2	13.34	44.48	4
90	62	3.33	-1	-3.33	11.08	1
85	61	-8.33	-2	16.66	69.38	4
110	67	16.67	4	66.68	277.88	16
95	63	1.67	0	0	2.78	0

$$\sum = 140 \quad \sum = 583.28 \quad \sum = 34$$

$$\frac{140}{140.82} = 0.99417693$$

$$99.41769635$$

$$\frac{583.28}{\sqrt{34}} = 19,831.52 = \sqrt{19,831.52} = 140.82$$

Interpretación: La relación es fuerte, una relación positiva al consumir proteína, la masa muscular aumenta.

Problema 2: Relación entre Consumo de Agua y Pérdida de peso.

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

$$\bar{x} = \frac{2.0 + 2.5 + 1.8 + 3.0 + 2.2 + 2.7}{6} = 2.36$$

$$\bar{y} = \frac{0.5 + 0.7 + 0.4 + 0.9 + 0.6 + 0.8}{6} = 0.65$$

X	y	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
2	0.5	-0.36	-0.15	0.054	0.135	0.0225
2.5	0.7	0.14	0.05	0.007	0.0196	0.0025
1.8	0.4	-0.56	-0.25	0.14	0.3136	0.0625
3.0	0.9	0.64	0.25	0.16	0.4096	0.0625
2.2	0.6	0.16	-0.05	0.008	0.0256	0.0025
2.7	0.8	0.34	0.15	0.051	0.1156	0.0225
				$\sum = 0.42$	$\sum = 1.019$	$\sum = 0.175$

$$\frac{1.019}{\sqrt{1.019 \times 0.175}} = 0.78 = \sqrt{0.61} = 0.781004622$$

$$\frac{0.42}{0.421900} \times 100 = 99.5496$$

Indica una relación fuerte y positiva.

Problema 3: Relación entre preferencia de alimentos y género

Género	Vegetales	Proteínas	carbohidratos	
Masculino	12	18	10	→ 40
Femenino	15	12	13	→ 40
Total =	27	30	23	80

$$\text{Masculino Vegetales} = \frac{40 \times 27}{80} = 13.5 \quad (1)$$

$$\text{Masculino Prot.} = \frac{40 \times 30}{80} = 15 \quad (2)$$

$$\text{Femenino veg} = \frac{40 \times 27}{80} = 13.5 \quad (4)$$

$$\text{Masculino Carbos} = \frac{40 \times 23}{80} = 11.5 \quad (3)$$

$$\text{Fem. Prot} = \frac{40 \times 30}{80} = 15 \quad (5)$$

$$\text{Fem CH} = \frac{40 \times 23}{80} = 11.5 \quad (6)$$

$O_i - E_i$	$(O_i - E_i)^2$	$(O_i - E_i)^2 \div E_i$
1. $12 - 13.5 = -1.5$	2.25	$2.25 \div 13.5 = 0.16$
2. $18 - 15 = 3$	9	$9 \div 15 = 0.6$
3. $10 - 11.5 = -1.5$	2.25	$2.25 \div 11.5 = 0.19$
4. $15 - 13.5 = 1.5$	2.25	$2.25 \div 13.5 = 0.16$
5. $12 - 15 = -3$	9	$9 \div 15 = 0.6$
6. $13 - 11.5 = 1.5$	2.25	$2.25 \div 11.5 = 0.19$
		$\Sigma = 1.9$

El género sí influye en la alimentación

$$\chi^2 = 1.9$$

Problema 4: Relación entre Frecuencia de Consumo de Frutas y Nivel de Actividad Física.

Nivel de AF	Baja Frec.	Med. Frec.	Alta Frec.	
Sedentario	20	15	5	40
Moderao	10	25	15	50
Activo	5	20	25	50
	35	60	45	140

E_i	$O_i - E_i$	$(O_i - E_i)^2$	$(O_i - E_i)^2 \div E_i$
Sed. BF $\frac{35 \times 40}{140} = 10$	$20 - 10 = 10$	100	$100 \div 10 = 10$
Sed. MF $\frac{60 \times 40}{140} = 17.14$	$15 - 17.14 = -2.14$	4.57	$4.57 \div 17.14 = 0.2666$
Sed. AF $\frac{45 \times 40}{140} = 12.85$	$5 - 12.85 = -7.85$	61.62	$61.62 \div 12.85 = 4.79$
Mod. BF $\frac{35 \times 50}{140} = 12.5$	$10 - 12.5 = -2.5$	6.25	$6.25 \div 12.5 = 0.5$
Mod. MF $\frac{60 \times 50}{140} = 21.42$	$25 - 21.42 = 3.58$	12.81	$12.81 \div 21.42 = 0.59$
Mod. AF $\frac{45 \times 50}{140} = 16.07$	$15 - 16.07 = -1.07$	1.14	$1.14 \div 16.07 = 0.07$
Alta BF $\frac{35 \times 50}{140} = 12.5$	$5 - 12.5 = -7.5$	56.25	$56.25 \div 12.5 = 4.5$
Alta MF $\frac{60 \times 50}{140} = 21.42$	$20 - 21.42 = -1.42$	2.01	$2.01 \div 21.42 = 0.09$
Alta AF $\frac{45 \times 50}{140} = 16.07$	$25 - 16.07 = 8.93$	79.74	$79.74 \div 16.07 = 4.96$
		$\Sigma = 25.76$	

Actividad y Frecuencia independientes

$\chi^2 = 25.76$

Problema 5: Relación entre consumo de proteína y masa muscular.

$$\hat{y} = B_0 + B_1 x$$

$$B_0 = \bar{y} - B_1 \bar{x}$$

$$B_1 = \frac{140}{583.28} = 0.2400$$

$$B_0 = 63 - 0.2400 (93.33)$$

$$B_0 = 63 - 22.3992$$

$$\hat{y} = 40.6008 + 0.240 x, \quad B_0 = 40.6008$$

Problema 6: Relación entre consumo de Agua y Pérdida de peso

$$B_1 = \frac{0.42}{1.019} = 0.4121$$

$$\hat{y} = -0.322 + 0.4121 x$$

$$B_0 = 0.65 - 0.4121 (2.36)$$

$$B_0 = 0.65 - 0.972$$

$$B_0 = -0.322$$