COMPUTATION OF BIVARIATE STATISTICS FROM RAW DATA

Case	X_1	X_2	$X_1 - M_1 = x_1$	$X_2 - M_2 = x_2$	x_1^2	x_2^2	$x_1/s_1 = z_1$	$x_2/s_2 = z_2$	x_1x_2	z_1z_2
1	X_{11}	X_{21}	x_{11}	x_{21}	x_{11}^2	x_{21}^2	z_{11}	z_{21}	$x_{11}x_{21}$	$z_{11}z_{21}$
2	X_{12}	X_{22}	x_{12}	x_{22}	x_{12}^2	x_{22}^2	z_{12}	z_{22}	$x_{12}x_{22}$	$z_{12}z_{22}$
3	X_{13}	X_{23}	x_{13}	x_{23}	x_{13}^2	x_{23}^2	z_{13}	z_{23}	$x_{13}x_{23}$	$z_{13}z_{23}$
…	…	…	…	…	…	…	…	…	…	…
i	X_{1i}	X_{2i}	x_{1i}	x_{2i}	x_{1i}^2	x_{2i}^2	z_{1i}	z_{2i}	$x_{1i}x_{2i}$	$z_{1i}z_{2i}$
…	…	…	…	…	…	…	…	…	…	…
n	X_{1n}	X_{2n}	x_{1n}	x_{2n}	x_{1n}^2	x_{2n}^2	z_{1n}	z_{2n}	$x_{1n}x_{2n}$	$z_{1n}z_{2n}$
	ΣX_{1i}	ΣX_{2i}	$\Sigma x_{1i} = 0$	$\Sigma x_{2i} = 0$	Σx_{1i}^2	Σx_{2i}^2	$\Sigma z_{1i} = 0$	$\Sigma z_{2i} = 0$	$\Sigma x_{1i}x_{2i}$	$\Sigma z_{1i}z_{2i}$
	$1/n\Sigma X_{1i} = M_1$	$1/n\Sigma X_{2i} = M_2$			$1/n\Sigma x_{1i}^2 = s_1^2$	$1/n\Sigma x_{2i}^2 = s_2^2$			$1/n\Sigma x_{1i}x_{2i} = c_{12}$	$1/n\Sigma z_{1i}z_{2i} = r_{12}$