$\boxed{2.2}$

$\mu_x := E[x]$

$\mu_y := E[y]$

$\sigma_x^2 := D[x] := E[(x - E[x])^2] = E[(x - \mu_x)^2] \geq 0$

$\sigma_y^2 := D[y] := E[(y - E[y])^2] = E[(y - \mu_y)^2] \geq 0$

$cov_{xy} := E[(x - E[x])(y - E[y])] = E[(x - \mu_x)(y - \mu_y)]$

$? \; |cov_{xy}| \leq \sigma_x \sigma_y \iff$

$\iff -\sigma_x \sigma_y \leq cov_{xy} \leq \sigma_x \sigma_y$

$\sigma_x \geq 0 \wedge \sigma_y \geq 0 \Rightarrow$

$\Rightarrow \sigma_x \sigma_y \geq 0$

$\sigma_x \neq 0 \wedge \sigma_y \neq 0$

$\frac{-\sigma_x \sigma_y}{\sigma_x \sigma_y} \leq \frac{cov_{xy}}{\sigma_x \sigma_y} \leq \frac{\sigma_x \sigma_y}{\sigma_x \sigma_y} \iff$

$\iff -1 \leq \frac{cov_{xy}}{\sigma_x \sigma_y} \leq 1$

$r := \frac{cov_{xy}}{\sigma_x \sigma_y}$

$-1 \leq r \leq 1$

$$\boxed{\begin{array}{l} r := \dfrac{cov_{xy}}{D[x]\,D[y]} \\[2ex] -1 \leq r \leq 1 \end{array}}$$