Common Covariance Identities

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$Cov(X, Y) = E[X - E(X)][Y - E(Y)]$
$Cov(X, Y) = E[XY] - E[X]E[Y]$
$Cov(aX, bY) = abCov(X, Y)$
$Cov(X, Y)^2 \leq Var(X)Var(Y)$
$Cov(X + a, Y) = Cov(X, Y)$
$Cov(a_1X_1 + a_2X_2, Y) = a_1Cov(X, Y) + a_2Cov(X_2, Y)$
$Cov(aX + b, cY + d) = acCov(X, Y)$
$Cov(X + Y, X - Y) = Var(X) - Var(Y)$
$Var(X + Y) = Var(X) + Var(Y) + 2Cov(X, Y)$
$Cov\left[\sum_{i=1}^{n}(a_iX_i + b_i), \sum_{j=1}^{m}(c_jY_j + d_j)\right] = \sum_{i=1}^{n}\sum_{j=1}^{m} a_ia_jCov(X_i, Y_j)$
$\sum_{i=1}^{n}\sum_{j=1}^{n} Cov(X_i, X_j) = \sum_{i=1}^{n} Var(X_i) + \sum_{i=1}^{n}\sum_{j\neq i}^{n} Cov(X_i, X_j)$
$Cov(X, Y) = \sqrt{(Var(X)}\sqrt{(Var(Y)}Corr(X, Y)$
$Cov(\sum_{i=1}^{n} X_i, \sum_{j=1}^{n} X_j) = Var(\sum_{i=1}^{n} X_i)$
$Var\left(\sum_{i=1}^{n} X_i\right) = \sum_{i=1}^{n} Var(X_i) + 2\sum\sum_{i<j}^{n} Cov(X_i, X_j)$