**PRIMA PARTE:** Esempio 1 di allineamento: colonne proporzionali

\[ N = 20 \]

\[
A = \text{matrix}(nrow=N, ncol=5) \\
A[,1] = \text{rnorm}(N) \\
A[,2] = 2A[,1] + 0.05*\text{rnorm}(N) \\
A[,3] = \text{rnorm}(N) \\
A[,4] = \text{rnorm}(N) \\
A[,5] = \text{rnorm}(N) \\
\]

\[
\]

\[
\text{cor}(A) \\
\]

\[
\text{summary(Reg1)} \\
\]

\[
\text{Reg2} = \text{lm}(Y \sim A[,1] + A[,3] + A[,4] + A[,5]) \\
\text{summary(Reg2)} \\
\]

\[
X = \text{matrix}(nrow=N, ncol=6) \\
X[,6] = 1 \\
\text{solve(t(X)**X)} \\
\]
SECONDA PARTE: Esempio 2 di allineamento: colonne AFFINI

\[ B = \text{matrix}(\text{nrow}=N, \text{ncol}=5) \]
\[ B[,1]=\text{rnorm}(N) \]
\[ B[,2]=B[,1]+2+0.05*\text{rnorm}(N) \]
\[ B[,3]=\text{rnorm}(N) \]
\[ B[,4]=\text{rnorm}(N) \]
\[ B[,5]=\text{rnorm}(N) \]

\[ \text{cor}(B) \]

\[ \text{Reg3} = \text{lm}(Y \sim B[,1]+B[,2]+B[,3]+B[,4]+B[,5]) \]
\[ \text{summary(Reg3)} \]

\[ \text{Reg4} = \text{lm}(Y \sim B[,1]+B[,3]+B[,4]+B[,5]) \]
\[ \text{summary(Reg4)} \]

\[ X2 = \text{matrix}(\text{nrow}=N, \text{ncol}=6) \]
\[ X2[,1:5]=B[,1:5] \]
\[ X2[,6]=1 \]
\[ \text{solve(t(X2)\%\%X2)} \]