Linear Independence

To detect linear dependence in rows or columns, the simplest way I’ve found is by using the qr function to check rank.

The rank is 3, and it’s a 3×3 matrix, so we have linear independence. First, establish A as the matrix, then transpose it in the qr function so we’re checking columns for linear dependence. The book later proves that row and column ranks are equal, but for the sake of this exercise, we’ll be sure to check columns.

A <- matrix(c(-3,0,2,1,1,0,0,-1,0), nrow = 3, byrow = TRUE qr(t(A), tol = NULL)

Example below is performed with the code below, interpreting similarly.

A <- matrix(c(2,-4,0,3,19,0,7,-5,0 , nrow = 3, byrow = TRUE) qr(t(A), tol = NULL)