Ralph's Subspaces

This is a continuation of Ralph's structure.

Required:

1. Find the number of linearly independent rows and columns of the A matrix (in other words, the dimension of the rowspace and columnspace – also called the rank of the matrix). What is the relation between spanning trees and a basis for the rowspace of the incidence matrix A?

2. What is the dimension of the orthogonal subspaces to the rows, the nullspace, and the columns, the left nullspace? Find a basis for the nullspace and the left nullspace. Hint: the network graph may be instructive.

3. Suppose when trying to find a consistent solution to $Ay = x$ we disconnect the graph, what happens to the dimension of the nullspaces?