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Potentially inconsistent: when the matrix Ase has one or more rows that are linearly dependent on other rows. This means it will either have zero or at least one solutions depending on the force vector u. This effectively means that the structure is unstable or soft. Instable would lead to sudden catastrophic failure from a small deformation. Having soft modes would mean that the structure could be deformed and hold the deformed shape, potentially making it even weaker.

Underdetermined: when a matrix has fewer independent equations than there are unknowns. Underdetermined can be a useful feature for controllability of force distribution in members. Most tensegrity systems are underdetermined.

Michell Truss:

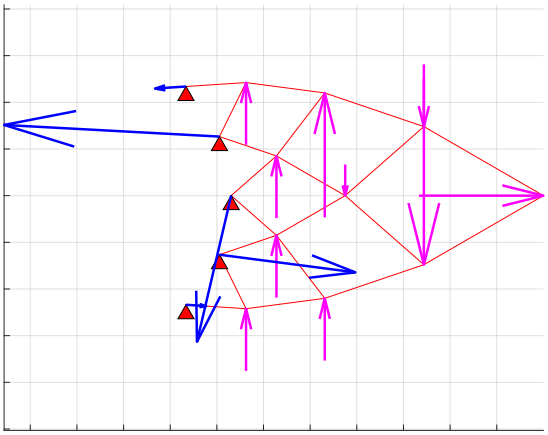
With the truss constructed solely from bars, the truss was neither potentially inconsistent nor underdetermined, even when forces were applied in both the 'x' and 'y' directions. This is good. Depending on the loading some bars may not be under compression so members could be changed in specific loading circumstances.

Nonminimal Prism:

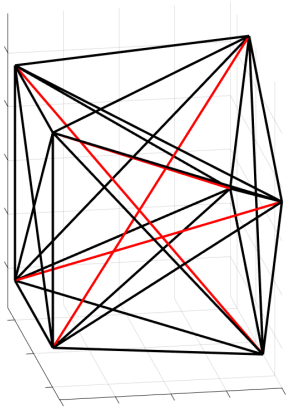
This prism has the maximum possible number of members by having 4 bars and 24 strings connecting each node to every other node that it isn't connected to by a bar. This prism is both underdetermined and potentially inconsistent, even when the prism is shaped as a cube. To solve the potential inconsistency, more stings or fixed nodes could be applied. However, it's not possible to apply more strings to this structure. Loads must be applied on the vertical axis otherwise the code fails to calculate the forces and reactions on the prism when it is turned outside of a cube shape. This structure is pretensionable.

DBar:

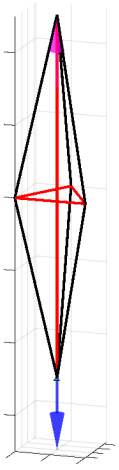
DBar is underdetermined and potentially inconsistent. It is pretensionable. Depending on the loading bars could be under tension or compression.



matlab 1: Michell Truss with various loads and reactions.



matlab 2: nonminimal prism, no loading depicted



matlab 3: DBar with vertical load