You can paste your MATLAB output into a file. Don't turn on rational formatting.

1) (2 pts) Use MATLAB to solve the linear system

$$\begin{aligned} 3a - 2b + c &= 13 \\ a - b + c &= 10 \\ 3a + 2b - 3c &= -6. \end{aligned}$$

2) (2 pts) Use MATLAB to solve the linear system

$$\begin{aligned} a + b + c + d &= 2 \\ \sqrt{3}a - \sqrt{2}b + \ln(4)c - \sin(2)d &= 10 \\ a - b - c - d &= 2 \\ a - b - 2c + 3d &= -3. \end{aligned}$$

3) (3 pts) Use MATLAB to solve the linear system below. Be careful with your coefficient matrix for this problem

$$\begin{aligned} a + b + c &= 1 \\ c - b - a &= 2 \\ b - a + 2c &= 3. \end{aligned}$$

4) (3 pts) Repeat the first three problems, but in each case, replace the right-hand side vector with all zeros. What you you observe about the solutions you get?

5) (12 pts) Solve the problem below to find the forces at each of the numbered beams. Hints:

   – Remember to put each equation in standard form before setting up the coefficient matrix and right hand side. For example, the first equation is

   $$f_2 = f_6.$$

   Write this as

   $$f_2 - f_6 = 0.$$

   The above equation means that for this equation, you would have a 1 in column 2 (for the coeffcient of f_2) and a -1 in column 6 (for the coefficient of f_6) and a 0 in the right-hand side vector.

   – The coefficient matrix is going to be 13×13. Don't try to set this up as one giant matrix. You can enter elements a row at a time using the syntax

```
A(1,:) = [........]     % Row 1
A(2,:) = [........]     % Row 2
```

   – It will be helpful to define $a = \frac{1}{\sqrt{2}}$.

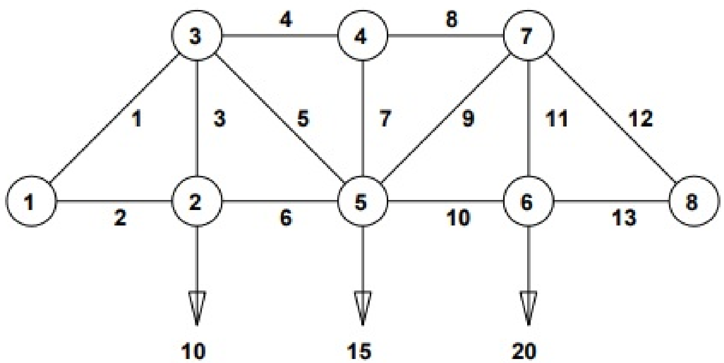

Figure 2.6. *A plane truss.*

cally. Resolving the member forces into horizontal and vertical components and defining $\alpha = 1/\sqrt{2}$, we obtain the following system of equations for the member forces f_i:

$$
\begin{aligned}
\text{Joint 2:} &\quad f_2 = f_6, \\
&\quad f_3 = 10; \\
\text{Joint 3:} &\quad \alpha f_1 = f_4 + \alpha f_5, \\
&\quad \alpha f_1 + f_3 + \alpha f_5 = 0; \\
\text{Joint 4:} &\quad f_4 = f_8, \\
&\quad f_7 = 0; \\
\text{Joint 5:} &\quad \alpha f_5 + f_6 = \alpha f_9 + f_{10}, \\
&\quad \alpha f_5 + f_7 + \alpha f_9 = 15; \\
\text{Joint 6:} &\quad f_{10} = f_{13}, \\
&\quad f_{11} = 20; \\
\text{Joint 7:} &\quad f_8 + \alpha f_9 = \alpha f_{12}, \\
&\quad \alpha f_9 + f_{11} + \alpha f_{12} = 0; \\
\text{Joint 8:} &\quad f_{13} + \alpha f_{12} = 0.
\end{aligned}
$$

Figure 1: Taken from *Numerical Computing in Matlab*, Cleve Moler.