



1 The Constraints

TP 01

To draw the feasible set in MATLAB, you'll first need to define the constraints of your problem and then plot them. Here's a basic example of how you can do this:

```
% Define the range for x and y
x = lower point :step:upper point;
y = lower point :step:upper point;
[X,Y] = meshgrid(x,y);
% Define the constraints
constraint1 = g1=0;
constraint2 = g2 <= 0;
constraint3 = g3 >= 0;
constraint4 = g4 >= 0;
% Combine the constraints
feasible_set = constraint1 & constraint2 & constraint3 & constraint4;
% Plot the feasible set
figure;
contourf(X,Y,feasible_set);
xlabel('x');
ylabel('y');
title('Feasible Set');
colorbar;
```

In this example, we're creating a grid of points (X, Y) using meshgrid, then defining the constraints (constraint1, constraint2, constraint3, constraint4).

We combine these constraints using logical AND (&) to obtain the feasible set. Finally, we plot the feasible set using contourf.

Problem 1 Draw the feasible set of the following

let's say we have the following constraints:

$$\Omega_1 = \{(x, y) \in \mathbb{R}^2 / 2x + y \leq 12 \text{ and } x + 3y \leq 1 \text{ and } x \geq 0 \text{ and } y \geq 0\}$$

$$\Omega_2 = \{(x, y) \in \mathbb{R}^2 / x^2 + y^2 \leq 16\}$$

$$\Omega_3 = \{(x, y) \in \mathbb{R}^2 / x^2 + y^2 \geq 16 \text{ and } x \geq 0\}$$

$$\Omega_4 = \{(x, y) \in \mathbb{R}^2 / x^2 + y^2 \geq 4 \text{ and } x^2 + y^2 \leq 15\}$$

$$\Omega_5 = \{(x, y) \in \mathbb{R}^2 / y \leq \exp(-x)\}$$

$$\Omega_6 = \{(x, y) \in \mathbb{R}^2 / y \geq \sin(x)\}$$

$$\Omega_7 = \{(x, y) \in \mathbb{R}^2 / y \geq \sin(x) \text{ and } y \geq \sin(x)\}$$