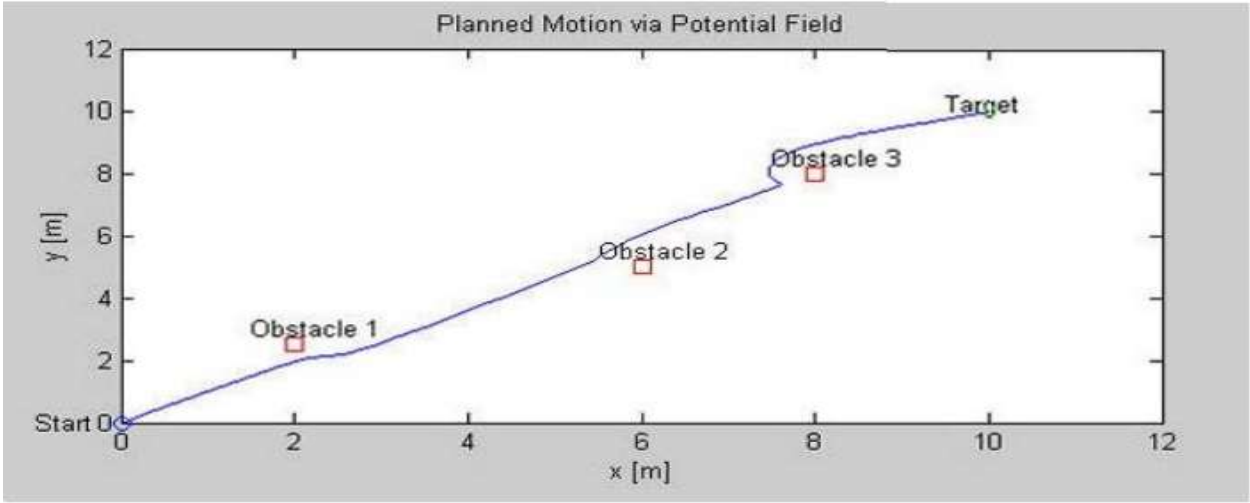
DASL 102: Homework #1 – Potential Fields

Objective: Use MATLAB to create a Potential Fields navigation algorithm that can navigate around 3 obstacles. GNU Octave is a free alternative to MATLAB.

The Space: A 10 x 10 space with the target at (10, 10), and obstacles at (2, 2), (6, 5), & (8, 8).

Due date: Next lecture (TBD)

Requirements: You output should look like below. Make sure to plot your results.



Reference: Please use the below code (found in lecture notes) for reference. You will need to define and tune your constants.

```
for i = 2:iterations % Run algorithm for 100 sample periods
    t(i-1) = T*(i-1); % Time in seconds

    % Distance to target
    rhoTarget(i-1) = sqrt(((yTarget-y(i-1))^2) + ((xTarget-x(i-1))^2));

    % Distance to an obstacle
    rho(i-1) = sqrt( ((yObstacle-y(i-1))^2) + ((xObstacle-x(i-1))^2) );

    % Calculate gradient
    if rho(i-1) < rho0
        ur_x = nRepulse*(xObstacle-x(i-1))*((1/rho(i-1))-1/rho0))/(rho(i-1)^3);
        ur_y = nRepulse*(yObstacle-y(i-1))*((1/rho(i-1))-(1/rho0))/(rho(i-1)^3);
    else
        ur_x = 0;
        ur_y = 0;
    end

    % Calculate new robot position
    x(i) = x(i-1) - T*nAttract*(x(i-1)-xTarget) - T*ur_x;
    y(i) = y(i-1) - T*nAttract*(y(i-1)-yTarget) - T*ur_y;
end
```