PID Controller MATLAB Code

```matlab
% PID Controller Design and Simulation for DC Motor
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clc; clear; close all;

% System Parameters
J = 0.01;  % moment of inertia
b = 0.1;   % damping coefficient
K = 0.01;  % motor constant
R = 1;     % armature resistance
L = 0.5;   % armature inductance

% Transfer Function of DC Motor (open-loop)
num = [K];
den = [L*J (L*b + R*J) (R*b + K^2)];
G = tf(num, den);

figure(1)
step(G);
title('Open Loop Step Response of DC Motor');
grid on;

% PID Controller Design using pidtune
C = pidtune(G, 'PID');

% Closed-Loop System
T = feedback(C*G, 1);

figure(2)
step(T);
title('Closed Loop Step Response with PID Controller');
grid on;

% Comparison of Open Loop and Closed Loop
figure(3)
step(G, T);
legend('Open Loop', 'Closed Loop (PID Controlled)');
title('Comparison of Open vs Closed Loop System');
grid on;

% Disturbance Rejection
disturbance = tf([0.1], [1 5 6]);
Y = feedback(G*C, 1);
figure(4)
step(Y*disturbance);
title('Disturbance Rejection Response');
grid on;

% Display system info
info_open = stepinfo(G);
info_closed = stepinfo(T);
disp('Open-loop Step Info:');
disp(info_open);
disp('Closed-loop Step Info:');
disp(info_closed);
```