```
num_robots = 1000;
u = [1; 6];
X = zeros(3, num_robots);
X_prime = zeros(size(X));
for i = 1:num_robots
    X_prime(:, i) = motion_model(X(:, i), u);
end
X_prime
```
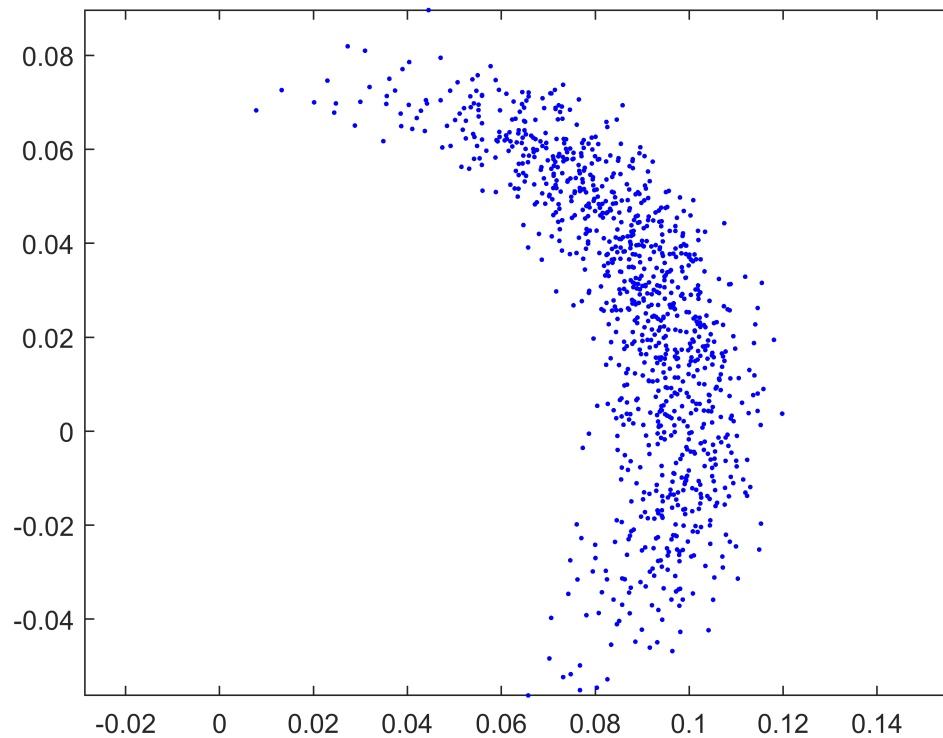
```
X_prime = 3×1000
    0.1055    0.0935    0.0927    0.0647    0.0922    0.1059    0.0542    0.1024 ···
   -0.0125    0.0009    0.0205    0.0439   -0.0292    0.0094    0.0580    0.0366
   -0.2366    0.0198    0.4364    1.1923   -0.6142    0.1779    1.6385    0.6860
```

```
plot(X_prime(1,:), X_prime(2,:), 'b.')
axis equal
```



```
function x_prime = motion_model(x, u)
    dt = 0.1;
    a = [0.002 0.002 0.2 0.2];
    v = u(1);
    w = u(2);
    u_hat = u + [a(1) * v^2 + a(2) * w^2;...
        a(3) * v^2 + a(4) * w^2]...
    .* randn(2, 1);
```

```matlab
    v = u_hat(1);
    w = u_hat(2);
    theta = x(3);
    x_prime = x +...
        [-v/w * sin(theta) + v/w * sin(theta + w * dt);...
        v/w * cos(theta) - v/w * cos(theta + w * dt);...
        w * dt];
end
```