

```
%Simulate Random walks
clf
clear

tic
trials = 500;
figure(1)
sgtitle('Random walks with different types of steps')
subplot(2,3,1)
hold on

y = 1:trials;
x = zeros(1,trials);

final_position = zeros(1,400);
%Coin flips
for coins = 1:1000

for t= 2:trials
    r = randi(2);

    switch r
        case 1
            x(t) = x(t-1) -1;

        case 2
            x(t) = x(t-1) +1;
        end
    end

end

plot(x,y, 'color','blue','LineWidth',1)

    x(t) = 200 + x(t);
    final_position(x(t)) = final_position(x(t)) +1;

end
ylabel('$t$', 'Interpreter','latex','FontSize',10)
xlabel('$\Delta x$', 'Interpreter','latex')
subplot(2,3,4)

bar(final_position,3)
ylabel('$P(x)$', 'Interpreter','latex','FontSize',10)
xlabel('$x + 200$', 'Interpreter','latex')

%-----
final_position = zeros(1,400);
```

```
subplot(2,3,2)
hold on
%Gaussian steps
for walkers = 1:1000

for step= 2:trials
    r = randn;
    x(step) = x(step-1) +r;
end
plot(x,y, 'color', 'blue', 'LineWidth',1)

    x(t) = 200 + round(x(t));
    final_position(x(t)) = final_position(x(t)) +1;

end

ylabel('$t$', 'Interpreter', 'latex', 'FontSize',10)
xlabel('$\Delta x$', 'Interpreter', 'latex')
subplot(2,3,5)

bar(final_position,3)
ylabel('$P(x)$', 'Interpreter', 'latex', 'FontSize',10)
xlabel('$x + 200$', 'Interpreter', 'latex')

final_position = zeros(1,400);
subplot(2,3,3)
hold on
%-----
%Asymetric steps

a = (1-sqrt(3))/2;
b = (1+sqrt(3))/2;

for walkers = 1:1000

for step= 2:trials
    r = randi(3);
    switch r
        case 1
            x(step) = x(step-1) -1;
        case 2
            x(step) = x(step-1) + a;
        case 3
            x(step) = x(step-1) + b;
    end
end

end
plot(x,y, 'color', 'blue', 'LineWidth',1)

    x(t) = 200+ round(x(t));
    final_position(x(t)) = final_position(x(t)) +1;
```

```
end
ylabel('$t$', 'Interpreter', 'latex', 'FontSize', 10)
xlabel('$\Delta x$', 'Interpreter', 'latex')
subplot(2,3,6)

bar(final_position,3)
ylabel('$P(x)$', 'Interpreter', 'latex', 'FontSize', 10)
xlabel('$x + 200$', 'Interpreter', 'latex')

toc
```