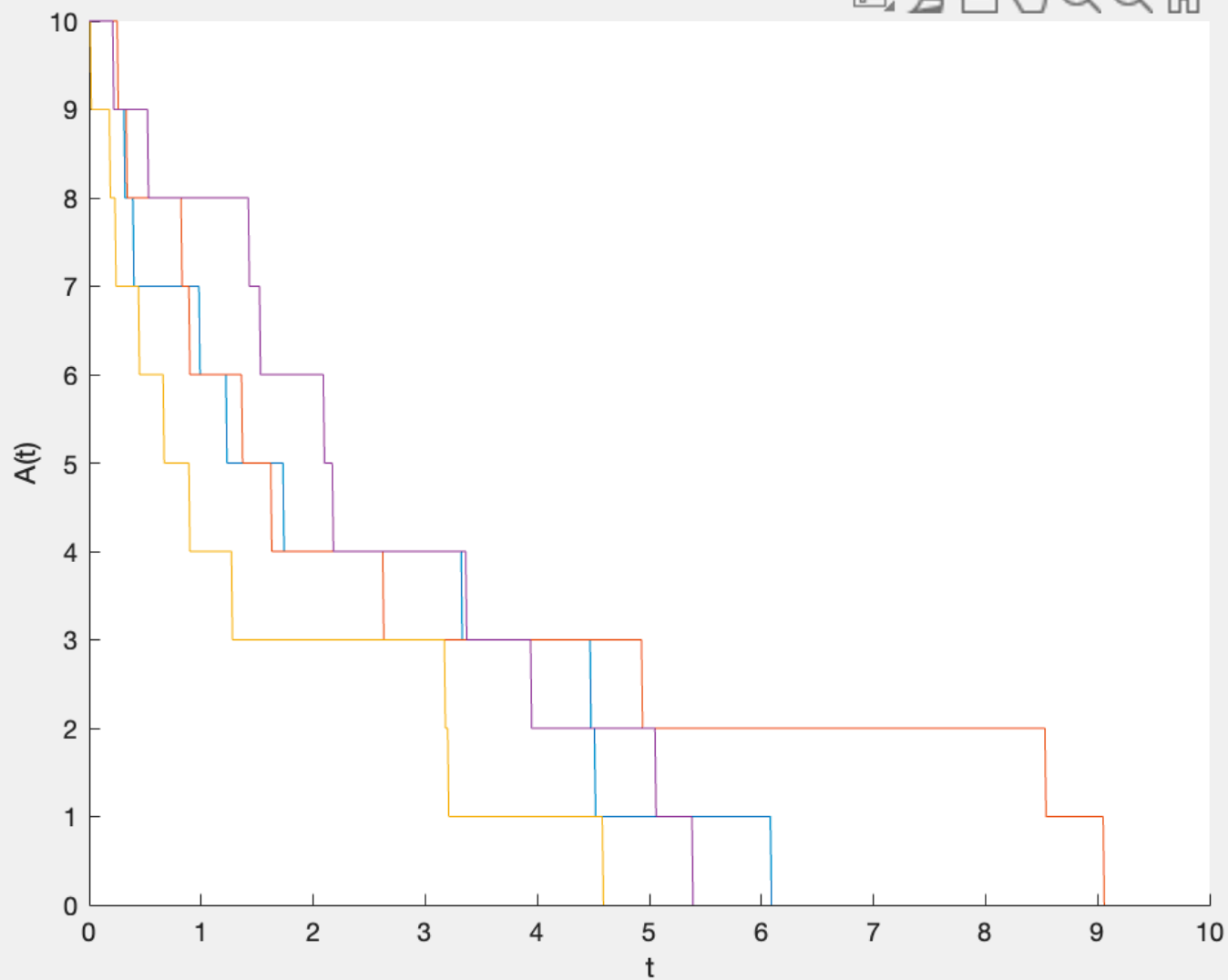


```
1  clc
2  clear all
3  close all
4
5
6  n=4; % number of realizations
7  A0=10; % starting number of molecules
8  % A=A0; % store the A
9  detat=0.01; % time step
10 k=0.5; % rate constant
11
12 figure
13 hold on
14 for i=1:n
15     A=A0; % store the A
16     j=1;
17     while A(j)>0
18         r=rand();
19         if r<A(end)*k*detat
20             A(j+1)=A(j)-1;
21         else
22             A(j+1)=A(j);
23         end
24         j=j+1;
25     end
26     plot(0:detat:(j-1)*detat,A)
27     xlabel('t')
28     ylabel('A(t)')
29 end
30
```

Figure 1

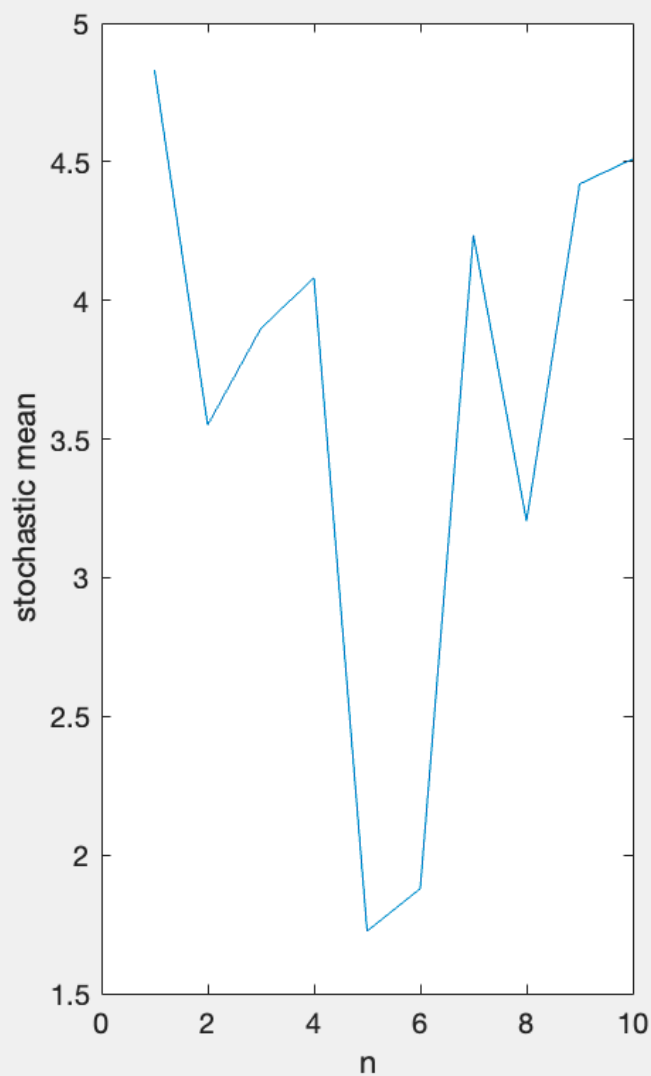
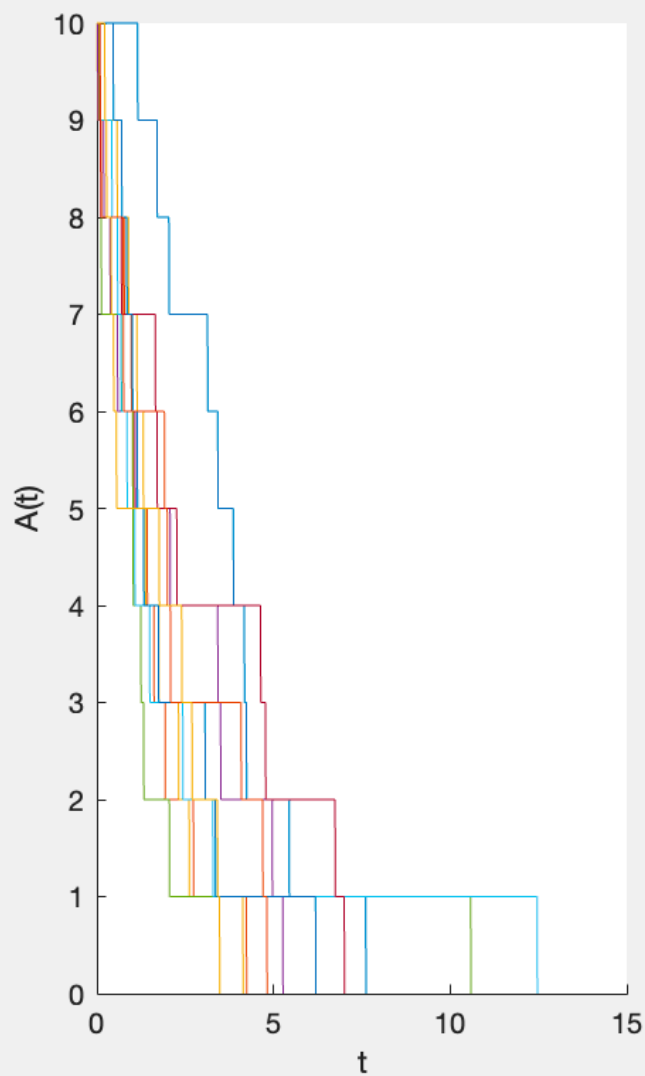
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```
1  clc
2  clear all
3  close all
4
5
6  n=10; % number of realizations
7  A0=10; % starting number of molecules
8  % A=A0; % store the A
9  detat=0.01; % time step
10 k=0.5; % rate constant
11 mean_A=zeros(n,1);
12
13 figure(1)
14 subplot(121)
15 hold on
16 for i=1:n
17     A=A0; % store the A
18     j=1;
19     while A(j)>0
20         r=rand();
21         tao=log(1/r)/A(j)/k;
22         count=ceil(tao/detat);
23         A(j+count)=A(j)-1;
24         j=j+count;
25     end
26     for ii=2:length(A)
27         if A(ii)==0
28             A(ii)=A(ii-1);
29         end
30     end
31     A(end)=0;
32     mean_A(i)=mean(A);
33     plot(0:detat:(length(A)-1)*detat,A)
34     xlabel('t')
35     ylabel('A(t)')
36 end
37 subplot(1,2,2)
38 plot(1:n,mean_A)
39 xlabel('n')
40 ylabel('stochastic mean')
41
42
```

Figure 1

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```
1  clc
2  clear all
3  close all
4
5
6  n=100; % number of realizations
7  A0=10; % starting number of molecules
8  % A=A0; % store the A
9  detat=0.01; % time step
10 k1=0.5; % rate constant of k1
11 k2=0.2; % rate constant of k1
12 mean_A=zeros(n,1);
13
14 figure(1)
15 subplot(121)
16 hold on
17 for i=1:n
18     A=A0; % store the A
19     j=1;
20     while j<=100
21         r1=rand();
22         r2=rand();
23         alpha0=A(j)*k1+k2;
24         tao=log(1/r1)/alpha0;
25         count=ceil(tao/detat);
26         if r2<k2/alpha0
27             A(j+count)=A(j)+1;
28         else
29             A(j+count)=A(j)-1;
30         end
31         j=j+count;
32     end
33     for ii=2:length(A)
34         if A(ii)==0
35             A(ii)=A(ii-1);
36         end
37     end
38     A(end)=0;
39     A=A(1:100); % 100 reactions
40     mean_A(i)=mean(A);
41     % subplot(3,4,i)
42     plot(0:detat:(length(A)-1)*detat,A)
43     xlabel('t')
44     ylabel('A(t)')
45 end
46 subplot(1,2,2)
47 plot(1:n,mean_A)
48 xlabel('n')
49 ylabel('stochastic mean')
50
```

Figure 1

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