

Contents

1 Homework	1
1.1 Practice Sheet 1	1
1.1.1 Question 1	1
1.1.2 Question 2	2
1.1.3 Question 3	2
1.1.4 Question 4	2
1.1.5 Question 5	3
1.1.6 Question 6	3
1.1.7 Question 7	3
1.1.8 Question 9	3
1.1.9 Question 10	3

1 Homework

1.1 Practice Sheet 1

1.1.1 Question 1

```
% 1
D = diag([24,10,5]);
e1 = [1;1;0];
e2 = [1;-1;0];
e3 = [0;0;1]
P = [e1 e2 e3];
A = P*D*inv(P)
% Diagonalization of A^5
A5 = P*D^5*inv(P)
```

e3 =

```
0
0
1
```

A =

```
17    7    0
 7   17    0
```

```
0    0    5
```

```
A5 =
```

```
4.0313e+06    3.9313e+06    0
3.9313e+06    4.0313e+06    0
           0           0    3.1250e+03
```

1.1.2 Question 2

```
A = randi([-3 3],5,5);
A = A - diag(diag(A));
eigenVal = [9;8;7;6;5];
A = A + eye(size(A));

A1 = triu(A);
A2 = tril(A);

newA = A2*A1;
B = newA*diag(eigenVal)*inv(newA);
```

1.1.3 Question 3

```
A = randi([-100 100],4,4);
A = A - diag(diag(A));
A = A + eye(size(A));
A1 = triu(A);
A2 = tril(A);
newA = A2*A1;
det(newA);
```

1.1.4 Question 4

```
A = randi([-9 9],7,7);
A = A - diag(diag(A));
A = A + eye(size(A));
A1 = triu(A);
A2 = tril(A);
newA = A2*A1;
det(newA)
```

```
inv(newA)
```

1.1.5 Question 5

```
% Create matrix with det 1
A = randi([1 100], 15,15);
A = A - diag(diag(A));
A = A + eye(size(A));
A1 = triu(A);
A2 = tril(A);
newA = A1*A2;
diagVec = ones(15,1);
diagVec(end) = 3;
S = diag(diagVec);
M = newA*S*inv(newA);
det(M)
```

1.1.6 Question 6

```
A = [-4 1 1; 1 -6 7; 1 7 -9];
P = randi(15,3);
B = P*A*inv(P)
P = randi(15,3);
C = P*A*inv(P)
```

1.1.7 Question 7

```
A = randi([1 9],10,3)*randi([1 9],3,5);
S = A*A'
S = A'*A
```

1.1.8 Question 9

```
A = randi([1 9],10,3)*randi([1 9],3,5);
S = A*A'
S = A'*A
```

1.1.9 Question 10

```
A = randi([1 2],4,4);
A = A - diag(diag(A));
```

```

A = A + eye(size(A));
A1 = triu(A);
A2 = triu(A);
newA = A2*A1;
eigVal = [1 2 3 4];
S = diag(eigVal);
D = newA*S*inv(newA);
A = (D-eigVal(1)*eye(size(A)))
B = (D-eigVal(2)*eye(size(A)))
C = (D-eigVal(3)*eye(size(A))*(D-eigVal(4)*eye(size(A))))

```