

## Contents

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- Gauss-Jordan elimination to get A inverse and display the result
- Display the MATLAB built-in result
- Compute & display the error

```
% HW 1 Problem 2(c) & (d)
% Find the inverse

clear
clc
close all

load('testproblem.mat')

szA = size(A,1);
I = eye(szA);
A4GJ = cat(2,A,I); % concatenated matrix of A & I
```

## Gauss-Jordan elimination to get A inverse and display the result

---

```
GJelsol = GJel(A4GJ);
disp('The inverse matrix of A is: ');
disp(GJelsol)
```

The upper triangular matrix is:  
Columns 1 through 7

-1.0149	-2.1321	2.1778	-0.2730	-0.7841	-0.4677	-0.2841
0	2.1349	0.1277	1.7030	-1.4414	0.0922	0.0452
0	0	-2.1480	0.2136	1.1336	1.4554	-1.4883
0	0	0	0.8624	-0.8568	-0.8022	0.3901
0	0	-0.0000	0	0.1172	1.3485	-0.9577
0	0	0.0000	0	0	-8.6038	6.3411
0	0	-0.0000	0	0	0	0.7162
0	0	-0.0000	0	0	0	-0.0000

Columns 8 through 14

-0.2883	1.0000	0	0	0	0	0
0.4839	-0.4641	1.0000	0	0	0	0
-1.6670	-0.0643	0.4295	1.0000	0	0	0
1.3688	-0.4115	0.2468	-0.0696	1.0000	0	0
1.1407	0.7086	-0.0734	-0.2259	-1.4176	1.0000	0
-11.5207	-5.0434	1.2794	2.3469	9.4661	-8.1997	1.0000
7.2391	0.6672	-1.9373	-2.0543	-1.5336	2.9258	-0.8867
13.5981	1.4177	-3.8323	-3.8600	-3.9135	5.8215	-1.6478

Columns 15 through 16

0	0
0	0
0	0
0	0
0	0

0	0
1.0000	0
2.0441	1.0000

The diagonal matrix is:  
Columns 1 through 7

-1.0149	0	0	0	0	0	0.0000
0	2.1349	0	0	0	0	0.0000
0	0	-2.1480	0	0	0	0.0000
0	0	0.0000	0.8624	0	0	-0.0000
0	0	-0.0000	0	0.1172	0	-0.0000
0	0	0.0000	0	0	-8.6038	0
0	0	0.0000	0	0	0	0.7162
0	0	-0.0000	0	0	0	-0.0000

Columns 8 through 14

-0.0000	0.4547	-0.3892	-0.0286	0.0894	0.5882	-1.0630
0.0000	-0.1152	-0.4159	-0.5244	-1.3373	0.4222	-0.5748
-0.0000	-0.4429	0.2286	0.8090	2.3959	0.0473	-1.2039
0.0000	-0.2803	0.3666	0.0624	-0.1440	-0.2697	0.7603
0.0000	-0.0082	-0.0654	-0.0469	-0.1531	0.0083	0.0766
0.0000	-3.0676	-2.8780	-0.9284	1.2826	-1.7325	-0.3123
-0.0000	-0.0875	0.1028	0.0006	0.5498	-0.1734	-0.0095
13.5981	1.4177	-3.8323	-3.8600	-3.9135	5.8215	-1.6478

Columns 15 through 16

0.5436	-0.2620
0.4744	0.4961
-0.6094	-0.8319
0.3712	0.2249
0.1044	0.0758
2.5125	5.5607
-0.0882	-0.5324
2.0441	1.0000

The reduced row-echelon form is:  
Columns 1 through 7

1.0000	0	0	0	0	0	-0.0000
0	1.0000	0	0	0	0	0.0000
0	0	1.0000	0	0	0	-0.0000
0	0	0.0000	1.0000	0	0	-0.0000
0	0	-0.0000	0	1.0000	0	-0.0000
0	0	-0.0000	0	0	1.0000	0
0	0	0.0000	0	0	0	1.0000
0	0	-0.0000	0	0	0	-0.0000

Columns 8 through 14

0.0000	-0.4480	0.3835	0.0281	-0.0881	-0.5795	1.0474
0.0000	-0.0540	-0.1948	-0.2456	-0.6264	0.1978	-0.2692
0.0000	0.2062	-0.1064	-0.3766	-1.1154	-0.0220	0.5605
0.0000	-0.3250	0.4251	0.0724	-0.1670	-0.3128	0.8816
0.0000	-0.0697	-0.5582	-0.4000	-1.3059	0.0704	0.6537
-0.0000	0.3565	0.3345	0.1079	-0.1491	0.2014	0.0363
-0.0000	-0.1222	0.1436	0.0008	0.7677	-0.2421	-0.0132
1.0000	0.1043	-0.2818	-0.2839	-0.2878	0.4281	-0.1212

Columns 15 through 16

-0.5356	0.2581
0.2222	0.2324
0.2837	0.3873
0.4305	0.2608
0.8908	0.6467
-0.2920	-0.6463
-0.1231	-0.7433
0.1503	0.0735

The inverse matrix of A is:

Columns 1 through 7

-0.4480	0.3835	0.0281	-0.0881	-0.5795	1.0474	-0.5356
-0.0540	-0.1948	-0.2456	-0.6264	0.1978	-0.2692	0.2222
0.2062	-0.1064	-0.3766	-1.1154	-0.0220	0.5605	0.2837
-0.3250	0.4251	0.0724	-0.1670	-0.3128	0.8816	0.4305
-0.0697	-0.5582	-0.4000	-1.3059	0.0704	0.6537	0.8908
0.3565	0.3345	0.1079	-0.1491	0.2014	0.0363	-0.2920
-0.1222	0.1436	0.0008	0.7677	-0.2421	-0.0132	-0.1231
0.1043	-0.2818	-0.2839	-0.2878	0.4281	-0.1212	0.1503

Column 8

0.2581  
0.2324  
0.3873  
0.2608  
0.6467  
-0.6463  
-0.7433  
0.0735

## Display the MATLAB built-in result

```
disp('Matlab,GNU/Octave built-in solution: ');  
disp(inv(A))
```

Matlab,GNU/Octave built-in solution:

Columns 1 through 7

-0.4480	0.3835	0.0281	-0.0881	-0.5795	1.0474	-0.5356
-0.0540	-0.1948	-0.2456	-0.6264	0.1978	-0.2692	0.2222
0.2062	-0.1064	-0.3766	-1.1154	-0.0220	0.5605	0.2837
-0.3250	0.4251	0.0724	-0.1670	-0.3128	0.8816	0.4305
-0.0697	-0.5582	-0.4000	-1.3059	0.0704	0.6537	0.8908
0.3565	0.3345	0.1079	-0.1491	0.2014	0.0363	-0.2920
-0.1222	0.1436	0.0008	0.7677	-0.2421	-0.0132	-0.1231
0.1043	-0.2818	-0.2839	-0.2878	0.4281	-0.1212	0.1503

Column 8

0.2581  
0.2324  
0.3873  
0.2608

0.6467  
-0.6463  
-0.7433  
0.0735

## Compute & display the error

---

```
Errr = inv(A) - GJelsol;  
disp('The error is: ');  
disp(Errr)
```

---

The error is:

1.0e-15 \*

Columns 1 through 7

0.3331	0.2220	0.7286	-0.4718	0	0.2220	0.2220
-0.1665	0.1388	0.0833	0	-0.0555	0.1110	0.0278
-0.1665	0.2082	0.1665	-0.6661	0.2394	0.1110	0.4441
-0.2776	0.2220	-0.0971	-0.5551	0.5551	-0.1110	0.4441
-0.5551	0.4441	-0.1110	-0.8882	0.5412	0.2220	0.6661
0.1665	-0.3331	-0.3469	0.4163	-0.2220	-0.1735	0
0.2359	-0.3886	-0.5694	0.4441	-0.0833	-0.3105	-0.0833
-0.0971	0	-0.0555	-0.1110	0.0555	0.0416	0.0278

Column 8

0.1110  
0.1110  
0  
-0.6661  
-0.6661  
0  
-0.3331  
0