

```

function cozum = GaussElim(A,b)

%This program solves a linear system of equations using
%the method of Gaussian elimination with back substitution
%Usage: GaussElim(A,b) where A is an nxn coefficient matrix.

[n n2]=size(A);
if n~=n2
    error('The coefficient matrix must be square')
end

[n3 n4]=size(b);
if n3~=n || n4~=1
    error('The column vector b must have the same number of rows as A')
end

A=[A b]
for i=1:n-1
    if A(i,i)==0
        [mxm indis]=max(abs(A(i:n,i)));
        A=interchange(A,i,indis+i-1);
    end
    for j=i+1:n
        carpan=A(j,i)/A(i,i);
        for k=i+1:n
            A(j,k)=A(j,k)-carpan*A(i,k);
        end
    end
end
end

```

```
end
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```
d=min(abs(diag(A)));
```

```
if d<10^-15
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```
    error('The system does not have unique solution')
```

```
end
```

```
cozum=zeros(n,1);
```

```
cozum(n)=A(n,n+1)/A(n,n);
```

```
for i=n-1:-1:1
```

```
    topl=0;
```

```
    for j=i+1:n
```

```
        topl=topl+A(i,j)*cozum(j);
```

```
    end
```

```
    cozum(i)=(A(i,n+1)-topl)/A(i,i)
```

```
end
```

```
end
```

```
function A=interchange(A,i,j)
```

```
%This function interchanges rows i and j of
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```
%the matrix A
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```
temp=A(i,:);
```

```
A(i,:)=A(j,:);
```

```
A(j,:)=temp;
```

```
end
```