```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
% forward elimination
for k = 1:n-1
  for i = k+1:n
    factor = Aug(i,k)/Aug(k,k);
    Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
  end
end
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

```matlab
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
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% forward elimination
for k = 1:n-1
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    factor = Aug(i,k)/Aug(k,k);
    Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
  end
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% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
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end
```

```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
```

$$A = \begin{matrix} 2 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & -3 & -1 \end{matrix} \qquad b = \begin{matrix} -3 \\ 1 \\ -6 \end{matrix}$$

```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
```

m = 3

n = 3

$$A = \begin{array}{ccc} 2 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & -3 & -1 \end{array}$$

$$b = \begin{array}{c} -3 \\ 1 \\ -6 \end{array}$$

```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
```

m = 3
n = 3

$$A = \begin{matrix} 2 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & -3 & -1 \end{matrix}$$

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```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
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Aug = [A b];
```

m = 3

n = 3

nb = 4

$$A = \begin{matrix} 2 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & -3 & -1 \end{matrix}$$

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```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
```

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{matrix}$$

$m = 3$

$n = 3$

$nb = 4$

$$A = \begin{matrix} 2 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & -3 & -1 \end{matrix}$$

$$b = \begin{matrix} -3 \\ 1 \\ -6 \end{matrix}$$

```
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
% forward elimination
for k = 1:n-1
  for i = k+1:n
    factor = Aug(i,k)/Aug(k,k);
    Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
  end
end
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

```
% forward elimination
for k = 1:n-1
  for i = k+1:n
    factor = Aug(i,k)/Aug(k,k);
    Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
  end
end
```

$n = 3$

$nb = 4$

$$Aug = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{array}$$

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 1

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{matrix}$$

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 1   i = 2

n = 3

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{matrix}$$

nb = 4

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 1   i = 2

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{matrix}$$

factor = 1/2

```
% forward elimination
for k = 1:n-1
   for i = k+1:n
      factor = Aug(i,k)/Aug(k,k);
      Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
   end
end
```

Rad 2 = Rad 2 – 1/2 Rad 1

k = 1   i = 2

n = 3

nb = 4   Aug =

$$\begin{array}{rrrr} 2 & 1 & 2 & -3 \\ 1 & 0 & 3 & 1 \\ 4 & -3 & -1 & -6 \end{array}$$

factor = 1/2

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

Rad 2 = Rad 2 – 1/2 Rad 1

k = 1   i = 2

n = 3

nb = 4   Aug =

2	1	2	-3
0	-0.5	2	2.5
4	-3	-1	-6

factor = 1/2

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 1   i = 2

n = 3   2   1   2   -3   factor = 1/2

nb = 4   Aug =   0 -0.5   2   2.5

             4   -3 -1 -6

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

$k = 1$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 4 & -3 & -1 & -6 \end{matrix}$$

```
% forward elimination
for k = 1:n-1
   for i = k+1:n
      factor = Aug(i,k)/Aug(k,k);
      Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
   end
end
```

$k = 1$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 4 & -3 & -1 & -6 \end{matrix}$$

factor = 4/2 = 2

```
% forward elimination
for k = 1:n-1
   for i = k+1:n
      factor = Aug(i,k)/Aug(k,k);
      Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
   end
end
```

Rad 3 = Rad 3 – 2 Rad 1

$k = 1$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 4 & -3 & -1 & -6 \end{matrix}$$

factor = 2

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

Rad 3 = Rad 3 – 2 Rad 1

k = 1   i = 3

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{matrix}$$

factor = 2

```matlab
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 1   i = 3

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{matrix}$$

```matlab
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

$k = 2$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{matrix}$$

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 2   i = 3

n = 3

nb = 4

$$\text{Aug} = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{array}$$

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

k = 2   i = 3

n = 3

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{matrix}$$

nb = 4

factor = -5/-0.5 = 10

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

Rad 3 = Rad 3 – 10 Rad 2

$k = 2$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & -5 & -5 & 0 \end{matrix}$$

factor = 10

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

Rad 3 = Rad 3 – 10 Rad 2

$k = 2$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array}$$

factor = 10

```
% forward elimination
for k = 1:n-1
    for i = k+1:n
        factor = Aug(i,k)/Aug(k,k);
        Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
    end
end
```

$k = 2$ $i = 3$

$n = 3$

$nb = 4$

$$Aug = \begin{array}{rrrr} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array}$$

```
% forward elimination
for k = 1:n-1
   for i = k+1:n
      factor = Aug(i,k)/Aug(k,k);
      Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
   end
end
```

k = 2

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$$

```matlab
[m,n] = size(A);
if m~=n, error('Matrix A must be square'); end
nb = n+1;
Aug = [A b];
% forward elimination
for k = 1:n-1
  for i = k+1:n
    factor = Aug(i,k)/Aug(k,k);
    Aug(i,k:nb) = Aug(i,k:nb)-factor*Aug(k,k:nb);
  end
end
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
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```
% back substitution
x = zeros(n,1);
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for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$n = 3$

$nb = 4$

$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$$

$$x = \begin{matrix} 0 \\ 0 \\ 0 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-25 \, x_3 = -25$$

$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$$

$$x = \begin{matrix} 0 \\ 0 \\ 0 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n)  = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-25\ x_3 = -25$$
$$x_3 = -25/-25 = 1$$

$$n = 3$$
$$nb = 4$$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ 0 \\ 0 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-25\, x_3 = -25$$
$$x_3 = -25/-25 = 1$$

$$n = 3$$
$$nb = 4$$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ 0 \\ -25/-25 = 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

i = 2

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \quad x = \begin{matrix} 0 \\ 0 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5\ x_2 + 2\ x_3 = 2.5$$

i = 2

n = 3

nb = 4

$$Aug = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array} \qquad x = \begin{array}{c} 0 \\ 0 \\ 1 \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5\ x_2 + 2\ x_3 = 2.5$$

$$-0.5\ x_2 \qquad = 2.5 - 2\ x_3$$

$$i = 2$$

$$n = 3$$

$$nb = 4$$

$$\text{Aug} = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array} \qquad x = \begin{array}{c} 0 \\ 0 \\ 1 \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5\ x_2 + 2\ x_3 = 2.5$$

$$-0.5\ x_2 \qquad = 2.5 - 2\ x_3$$

$$x_2 \qquad = (\ 2.5 - 2\ x_3\ ) / -0.5$$

i = 2

n = 3

nb = 4

$$\text{Aug} = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ 0 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
    x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5\ x_2 + 2\ x_3 = 2.5$$

$$-0.5\ x_2 = 2.5 - 2\ x_3$$

$$x_2 = (\ 2.5 - 2\ x_3\ )\ /\ -0.5$$

i = 2

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ 0 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
   x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5 \, x_2 + 2 \, x_3 = 2.5$$

$$-0.5 \, x_2 \qquad = 2.5 - 2 \, x_3$$

$$x_2 \qquad = (\, 2.5 - \boxed{2 \, x_3} \,) \, / \, -0.5$$

$i = 2$

$n = 3$

$nb = 4$

$$Aug = \begin{array}{ccccc} 2 & 1 & 2 & -3 & 0 \\ 0 & -0.5 & \boxed{2} & 2.5 & \\ 0 & 0 & -25 & -25 & \end{array} \qquad x = \begin{array}{c} 0 \\ 0 \\ \boxed{1} \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
    x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$-0.5\ x_2 + 2\ x_3 = 2.5$$

$$-0.5\ x_2 \qquad = 2.5 - 2\ x_3$$

$$x_2 \qquad = (\ 2.5\ -\ 2\ x_3\ )\ /\ -0.5$$

i = 2

n = 3

nb = 4

$$\text{Aug} = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array}$$

$$x = \begin{array}{c} 0 \\ (2.5-2)/-0.5 \\ 1 \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$I = 2$$
$$n = 3$$
$$nb = 4$$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ -1 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

i = 1

n = 3

nb = 4

$$Aug = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array}$$

$$x = \begin{array}{c} 0 \\ -1 \\ 1 \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$2\,x_1 + 1\,x_2 + 2\,x_3 = -3$$

i = 1

n = 3

nb = 4

$$\text{Aug} = \begin{array}{cccc} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{array} \qquad x = \begin{array}{c} 0 \\ -1 \\ 1 \end{array}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$2\ x_1 + 1\ x_2 + 2\ x_3 = -3$$
$$2\ x_1 \qquad\qquad = -3 - (1\ x_2 + 2\ x_3)$$

i = 1

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ -1 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$2 \, x_1 + 1 \, x_2 + 2 \, x_3 = -3$$
$$2 \, x_1 \qquad\qquad\; = -3 - (1 \, x_2 + 2 \, x_3)$$
$$x_1 \qquad\qquad\; = (-3 - (1 \, x_2 + 2 \, x_3)) / 2$$

i = 1

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ -1 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
    x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$2 \, x_1 + 1 \, x_2 + 2 \, x_3 = -3$$

$$2 \, x_1 \qquad\qquad = -3 - (1 \, x_2 + 2 \, x_3)$$

$$x_1 \qquad\qquad = (-3 - (1 \, x_2 + 2 \, x_3)) / 2$$

i = 1

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \qquad x = \begin{matrix} 0 \\ -1 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

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```
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$$x_1 = (-3 - (1\,x_2 + 2\,x_3))\,/\,2$$

i = 1

n = 3

nb = 4

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$$

(-3+1-2)/2 = -2

$$x = \begin{matrix} -2 \\ -1 \\ 1 \end{matrix}$$

```
% back substitution
x = zeros(n,1);
x(n) = Aug(n,nb)/Aug(n,n);
for i=n-1:-1:1
  x(i) = (Aug(i,nb)-Aug(i,i+1:n)*x(i+1:n))/Aug(i,i);
end
```

$$n = 3$$
$$nb = 4$$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix} \quad x = \begin{matrix} -2 \\ -1 \\ 1 \end{matrix}$$

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% back substitution
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$n = 3$

$nb = 4$

$$Aug = \begin{matrix} 2 & 1 & 2 & -3 \\ 0 & -0.5 & 2 & 2.5 \\ 0 & 0 & -25 & -25 \end{matrix}$$

$$x = \begin{matrix} -2 \\ -1 \\ 1 \end{matrix}$$