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()

E1.3.5 Exam Question 5

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■ Calculator

Exam 1 due Oct 31, 2023 09:12 IST

Question 5

2/2 points (graded)

```
function [ y_out ] = matvec( A, x, y )

n = size( A, 1 );
for j = 1:n

for i = 1:j-1
        y( i ) = A( i,j ) * x( j ) + y( i );
end

y( j ) = A( j,j ) * x( j ) + y( j );

for i = j+1:n
        y( i ) = A( i,j ) * x( j ) + y( i );
end

end

y_out = y;
return
```

fon i - 1·i_1

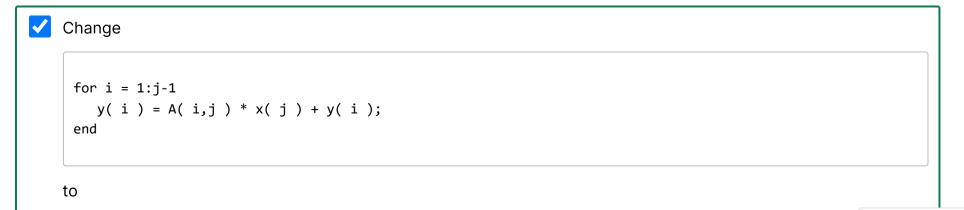
```
[y] := Matvec_unb_var2(A, x, y)
   where A_{TL} is 0 \times 0, x_T has 0 rows,
             y_T has 0 rows
while m(A_{TL}) < m(A) do
  Repartition
      where \alpha_{11} is 1 \times 1, \chi_1 has 1 row, \psi_1 has 1 row
    y_0 := \chi_1 a_{01} + y_0
    \psi_1 := \chi_1 \alpha_{11} + \psi_1
    y_2 := \chi_1 a_{21} + y_2
  Continue with
```

Both the MATLAB code on the left and the algorithm (expressed with FLAME notation) to its right implement the computation y := Ax + y (matrix-vector multiplication).

"Mark" on the above code/algorithm what you would modify so that the code/algorithm computes y:=Ax+y where A is symmetric, stored only in the lower triangular part of array A (or matrix A). Then answer the following questions:

endwhile

Which of the following modifications to the MATLAB code on the left yield implementations that compute y := Ax + y where A is symmetric, stored only in the lower triangular part of array A (mark all correct modifications):



```
101 1 - 1.1-1
  y(i) = A(j,i) * x(j) + y(i);
end
```

Change

```
for i = j+1:n
  y(i) = A(i,j) * x(j) + y(i);
```

to

```
for i = j+1:n
  y(i) = A(j,i) * x(j) + y(i);
end
```

Delete

```
for i = 1:j-1
  y(i) = A(i,j) * x(j) + y(i);
end
```

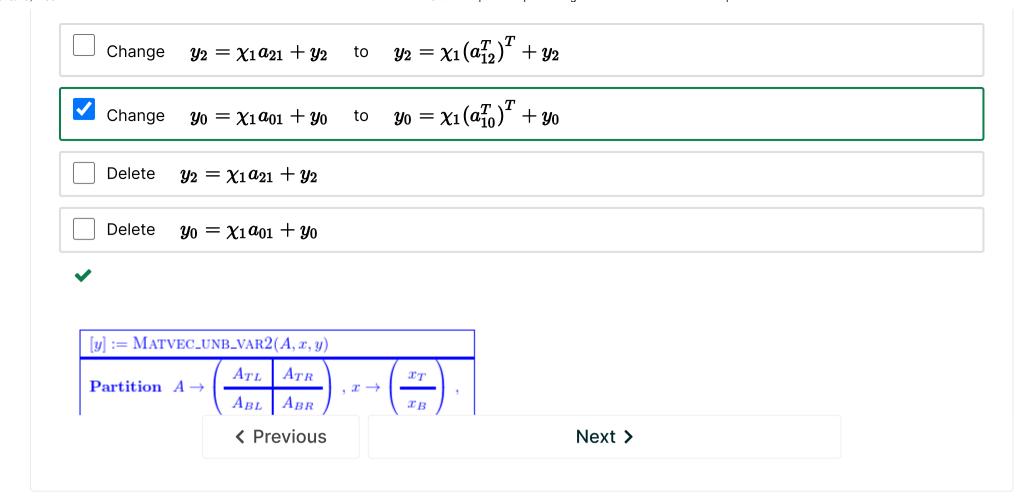
Delete

```
for i = j+1:n
  y(i) = A(i,j) * x(j) + y(i);
end
```

```
function [ y_out ] = matvec( A, x, y )
n = size(A, 1);
for j = 1:n
 for i = 1:j-1
 y(j) = A(j,j) * x(j) + y(j);
 for i = j+1:n
   y(i) = A(i,j) * x(j) + y(i);
end
y_{out} = y;
return
```

Which of the following modifications to the algorithm on the right yield implementations that compute y:=Ax \boldsymbol{A} is symmetric, stored only in the lower triangular part of matrix \boldsymbol{A} :





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