

Sample quiz questions

The quiz will be worth 5% of the total mark for the unit of study: it will be held in the lecture on Wednesday 30th March, 2011. The number of questions may vary from that shown here.

1. Given the following definitions (in MATLAB) of x and y

```
x=[1 2]; y=[2 3]
```

what is the result of the following MATLAB operation:

```
z=y.*x
```

2. With the same definitions of x and y as in the previous question what is the result of the MATLAB operation:

```
z=x*y'
```

3. What is the result of the following MATLAB code:

```
c = [1 2 3]; d = [3 4 5]; e = [c; d ; d];
```

4. Give the output from the following MATLAB code:

```
A = [ 1 2 3 4; 4 5 6 7; 7 8 9 10; 11 12 13 14];  
A(2,2:4)
```

5. Consider the file called **func.m** containing the MATLAB commands:

```
function z = func(x,y)  
z = 1+x^2*y;
```

What is the result of the MATLAB command

```
a = func(2,3)
```

6. What does the following MATLAB code calculate?

```
sum = 1;  
x = 1.7;  
add = 1;  
n = 100;  
for j = 1:n  
    add = add*x;  
    sum = sum+add/factorial(j);  
end  
format long  
disp(sum)
```

7. Consider the file called **check.m** containing the following MATLAB commands:

```
function z = check(x,y)
global a b

if x > a & y > b
    z = 1;
elseif x < a | y < b
    z = -1;
else
    z = 0;
end
```

What is the result of the following MATLAB commands?

```
global a b
a = sin(pi/2);
b = sin(pi);

z = check(0,-1)
```

8. Write a MATLAB function to calculate the following function $y(x)$ for any value of x , including the case where x is a vector:

$$y = \exp(\cos(x^3 + 2x^2 + 2))$$

9. If the array c has elements $c(i, j) = i + j$, $i = 1, \dots, 5$, $j = 1, \dots, 3$, write down the output expected from the following fragment of MATLAB code:

```
[m,n]=size(c);
[ c(m-2:m,1) c(m-2:m,n)]
```

10. Give a few lines of MATLAB code that use the `eig`, `real` and `find` commands to print all eigenvalues with positive real part for a given square matrix **A**. (Use the `help` or `doc` commands in MATLAB to find out how these commands work.)
11. Determine (by hand) the solution of the difference equation

$$x_{n+2} - 4x_n = 0, \quad x_0 = 1, x_1 = 1.$$

Write MATLAB code to find the sequence x_n from the difference equation for $n = 0, 1, \dots, 20$ and to also calculate the the exact solution that you have determined, and finally print out the differences between the two forms (which of course should be very close to zero) for these values of n .

12. Any of the introductory MATLAB exercises 1 to 7 on the sheet for Laboratories 2 and 3.