What is MATLAB?

Created by MathWorks for
Structural Dynamics

Math Works

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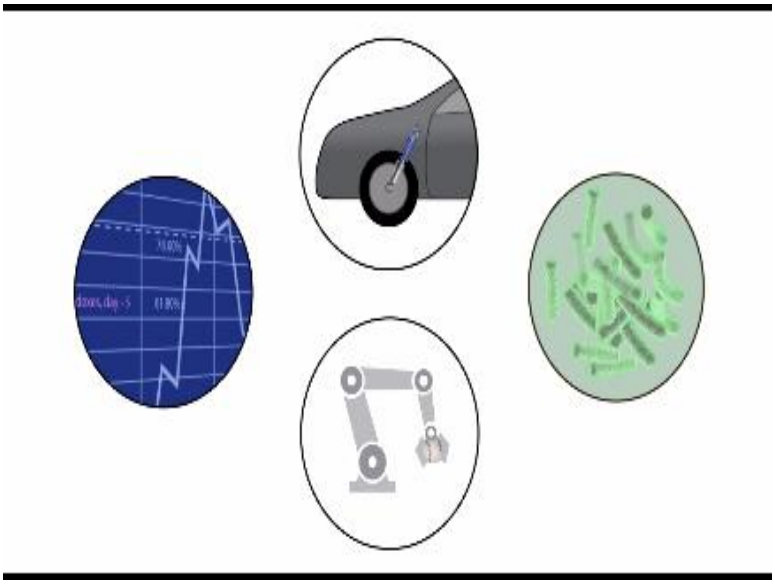

Welcome in this course we have the opportunity to use MATLAB to find solutions to problems that are too complex or too time consuming to solve by hand.

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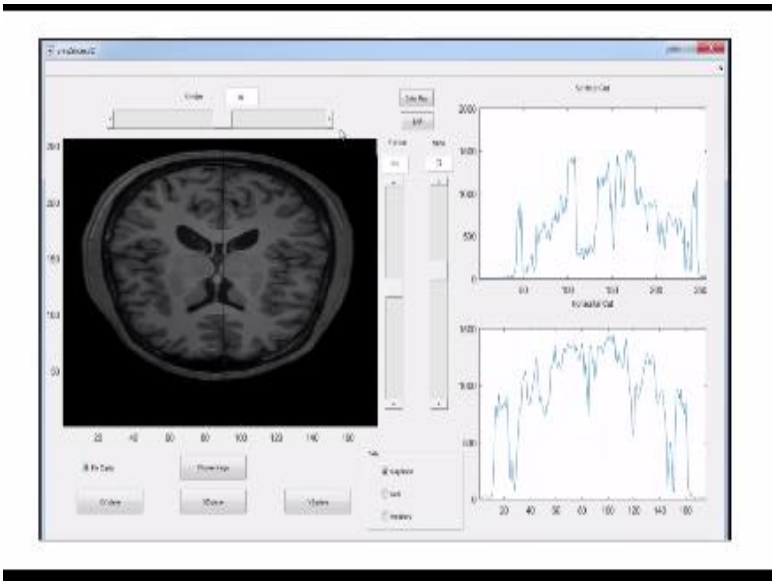

MATLAB also helps us explore and visualize ideas which leads to a better understanding of complicated systems. So what is MATLAB.

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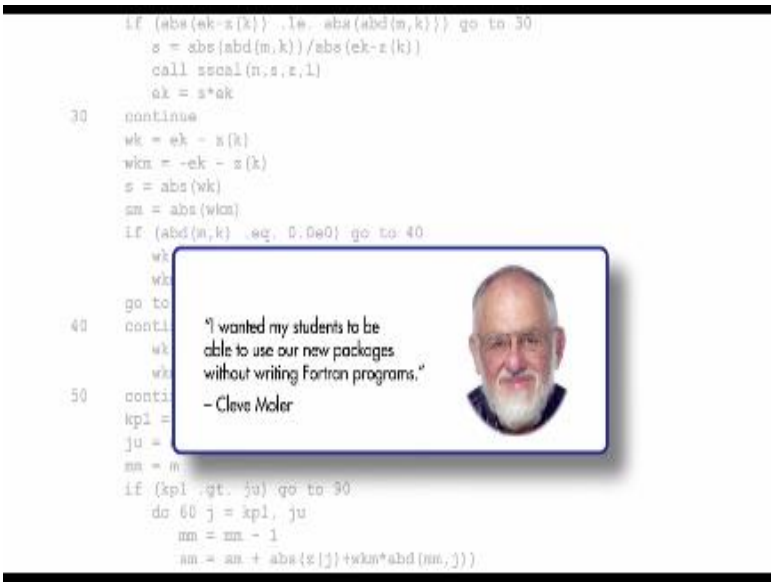

Well during the 60s and 70s computational packages enabled scientists and engineers to use computers for calculations that were near impossible previously. While these packages were available for general use you had to be a computer programmer to use them. MATLAB creator Cleve Moler wanted to make these packages accessible to his non computer programmer students, so that they could focus on solving problems without spending lots of time writing Fortran code.

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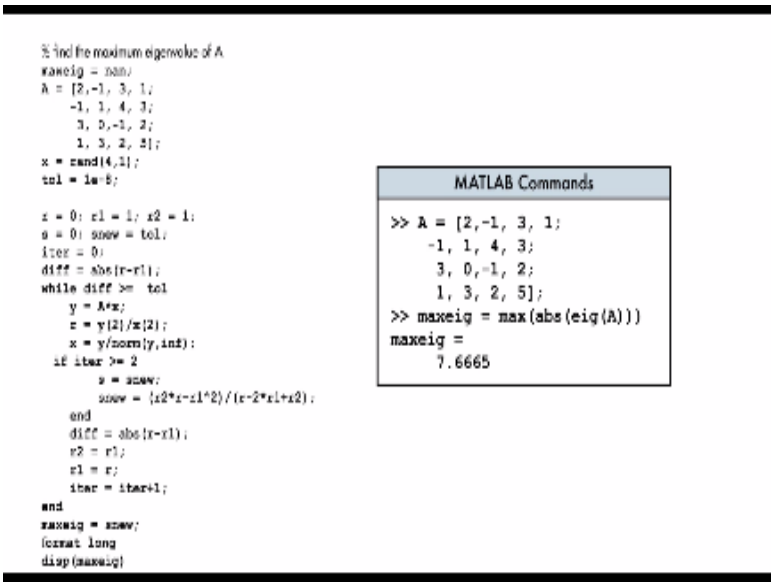

```
% find the maximum eigenvalue of A
maxeig = zeros;
A = [2,-1, 3, 1;
    -1, 1, 4, 3;
     3, 0,-1, 2;
     1, 3, 2, 5];
x = rand(4,1);
tol = 1e-6;

r = 0; r1 = 1; r2 = 1;
s = 0; snew = tol;
iter = 0;
diff = abs(r-r1);
while diff >=  tol
    y = A*x;
    r = y(2)/x(2);
    x = y/norm(y,inf);
  if iter >= 2
        s = snew;
        snew = (r2*r-r1^2)/(r-2*r1+r2);
    end
    diff = abs(r-r1);
    r2 = r1;
    r1 = r;
    iter = iter+1;
end
maxeig = snew;
format long
disp(maxeig)
```

MATLAB Commands

```
>> A = [2,-1, 3, 1;
    -1, 1, 4, 3;
     3, 0,-1, 2;
     1, 3, 2, 5];
>> maxeig = max(abs(eig(A)))
maxeig =
     7.6665
```

Rather than programming and debugging code sophisticated computations in MATLAB are done with a few simple commands.

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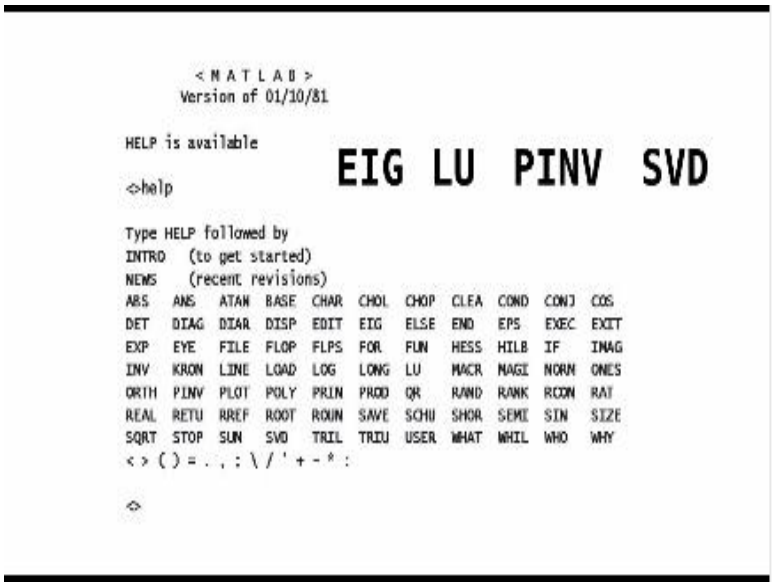

By 1981 MATLAB included 80 functions focusing on the matrix operations fundamental to many engineering applications.

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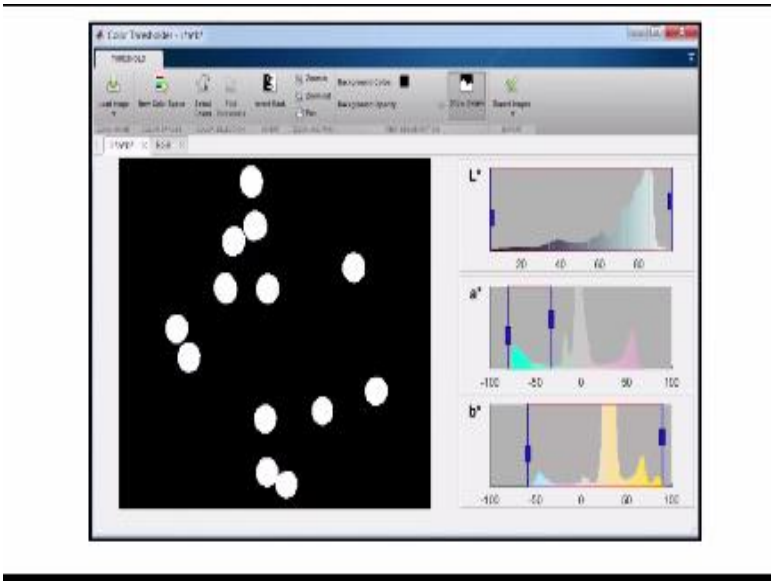

This idea of making computing accessible to a large audience continues today in abroad range of applications such as image processing.

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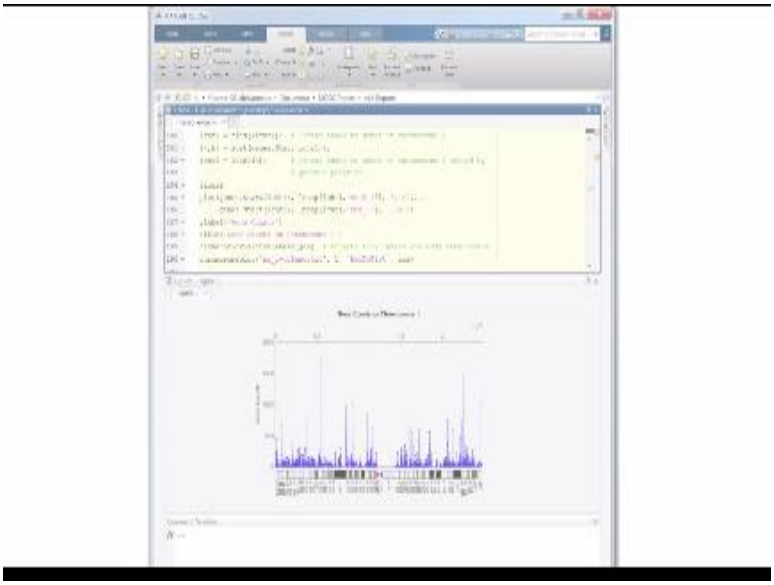

Biology.

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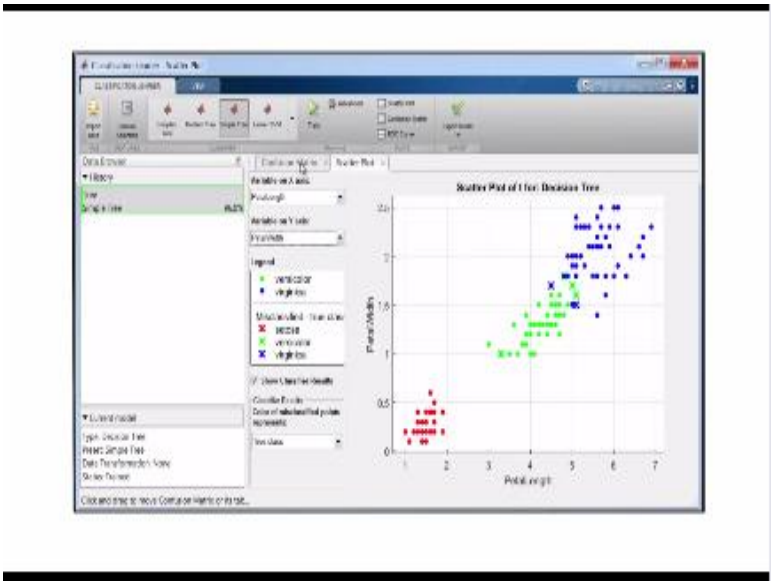

Machine learning.

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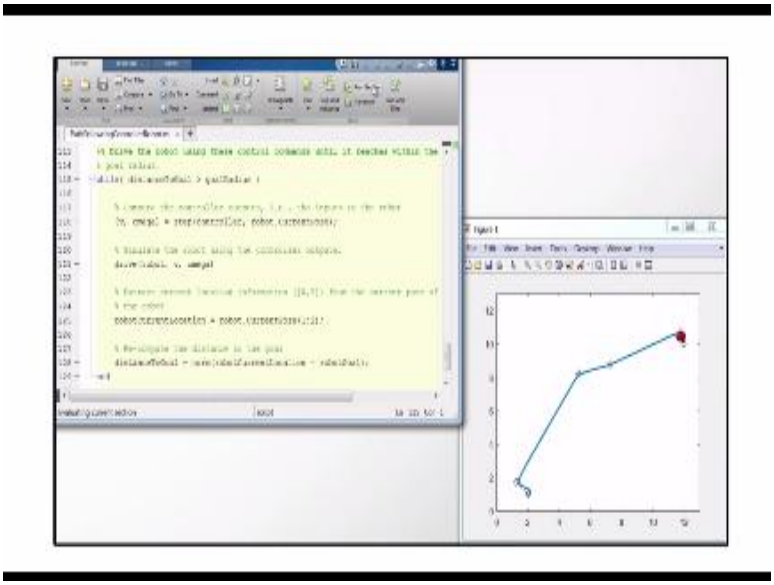

And robotics just to name a few.

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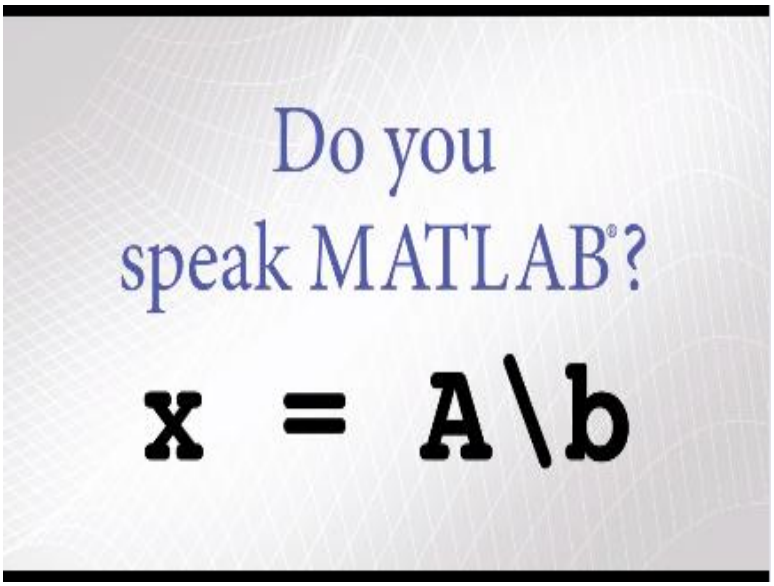

Now it's your turn to use MATLAB do not worry we are here to help so check out the MATLAB tutorials to get started and you too can speak MATLAB.

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