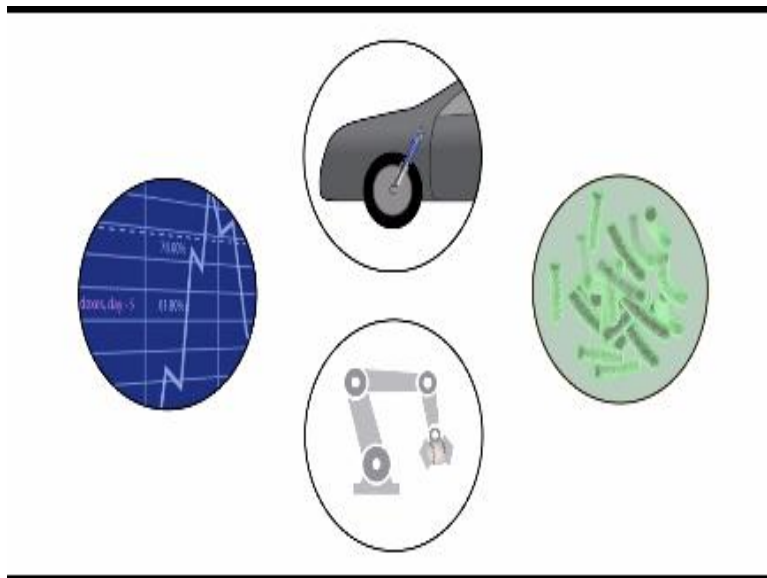


What is MATLAB?

Created by MathWorks for
Structural Dynamics

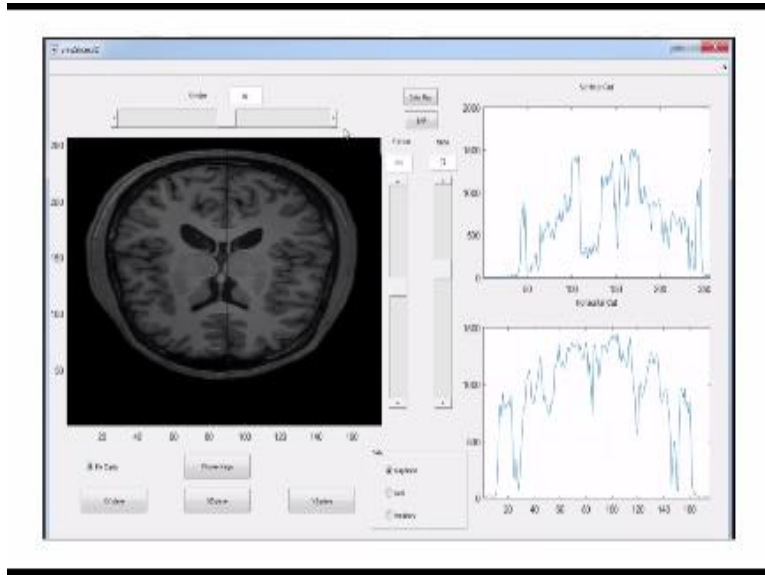
Math Works

(Refer Slide Time: 00:04)



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.

(Refer Slide Time: 00:17)



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

(Refer Slide Time: 00:26)

```
if (abs(ek-z(k)) .le. abs(abd(m,k))) go to 30
s = abs(abd(m,k))/abs(ek-z(k))
call sscal(n,s,z,1)
ek = s*ek
30 continue
wk = ek - z(k)
wkm = -ek - z(k)
s = abs(wk)
sm = abs(wkm)
if (abd(n,k) .eq. 0.0e0) go to 40
w
wk
wkm
go to
40 conti
wk
wkm
50 conti
kpl =
ju =
mm = n
if (kpl .gt. ju) go to 30
do 60 j = kpl, ju
mm = mm - 1
am = am + abs(z[j]+wkm*abd(mm,j))
```



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.

(Refer Slide Time: 00:59)

```
% find the maximum eigenvalue of A
maxeig = nan;
A = [2,-1, 3, 1;
     -1, 1, 4, 3;
      3, 0,-1, 2;
      1, 3, 2, 5];
x = rand(4,1);
tol = 1e-8;

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 = (x2*x-1^2)/(1x-2*x1+x2);
    end
    diff = abs(x-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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```
< M A T L A B >
Version of 01/30/81

HELP is available

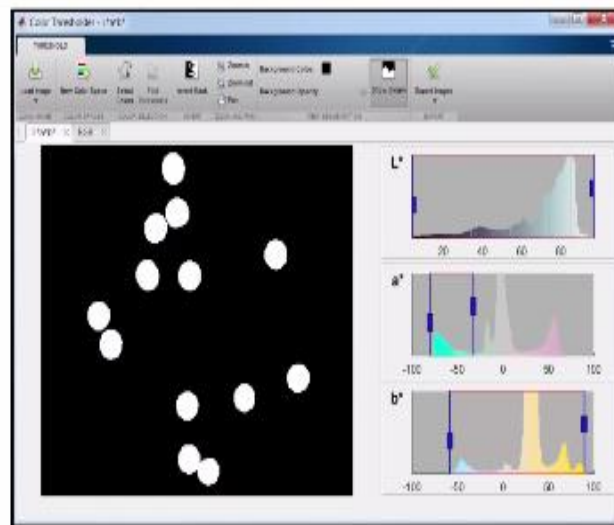
<help

Type HELP followed by
INTRO (to get started)
NEWS (recent revisions)
ABS ANS ATAN BASE CHAR CHOL CHOP CLEA COND CONJ COS
DET DIAG DIAR DISP EDIT EIG ELSE END EPS EXEC EXIT
EXP EYE FILE FLOP FLPS FOR FUN HESS HILB IF IMAG
INV KRON LINE LOAD LOG LONG LU MACR MAGE NORM ONES
ORTH PINV PLOT POLY PRLN PROD QR RAND RANK ROOM RAT
REAL RETU RREF ROOT ROUN SAVE SCHU SHOR SEMI SIN SIZE
SQRT STOP SUN SVD TRIL TRIU USER WHAT WHIL WHO WHY
<> ( ) = . , : \ / ' + - * :

<>
```

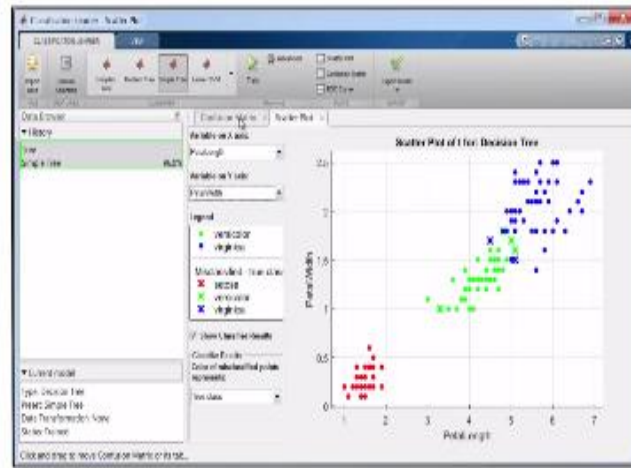
By 1981 MATLAB included 80 functions focusing on the matrix operations fundamental to many engineering applications.

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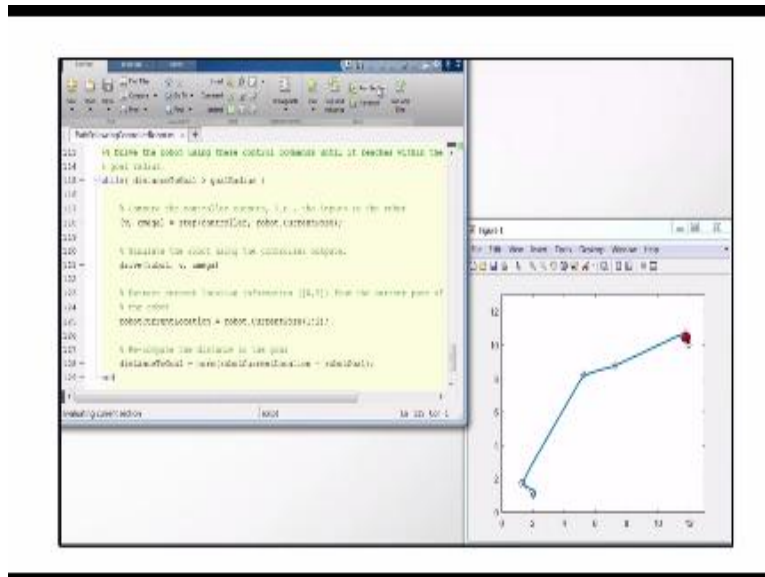
This idea of making computing accessible to a large audience continues today in a broad range of applications such as image processing.

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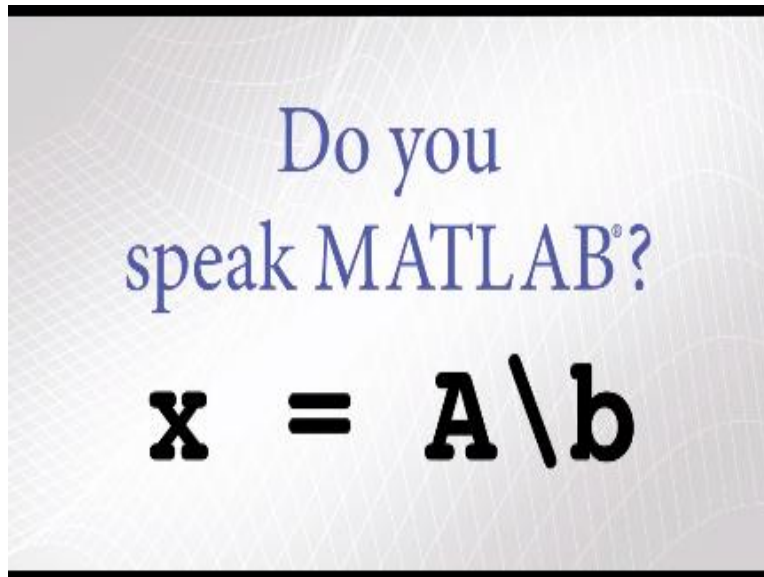
Machine learning.

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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.

MathWorks

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