Machine design M3

Project number 74

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This is my design

A diagram of a triangle with a point

Description automatically generated with medium confidence

And this is the lengths of it

A diagram of a triangle with numbers and lines

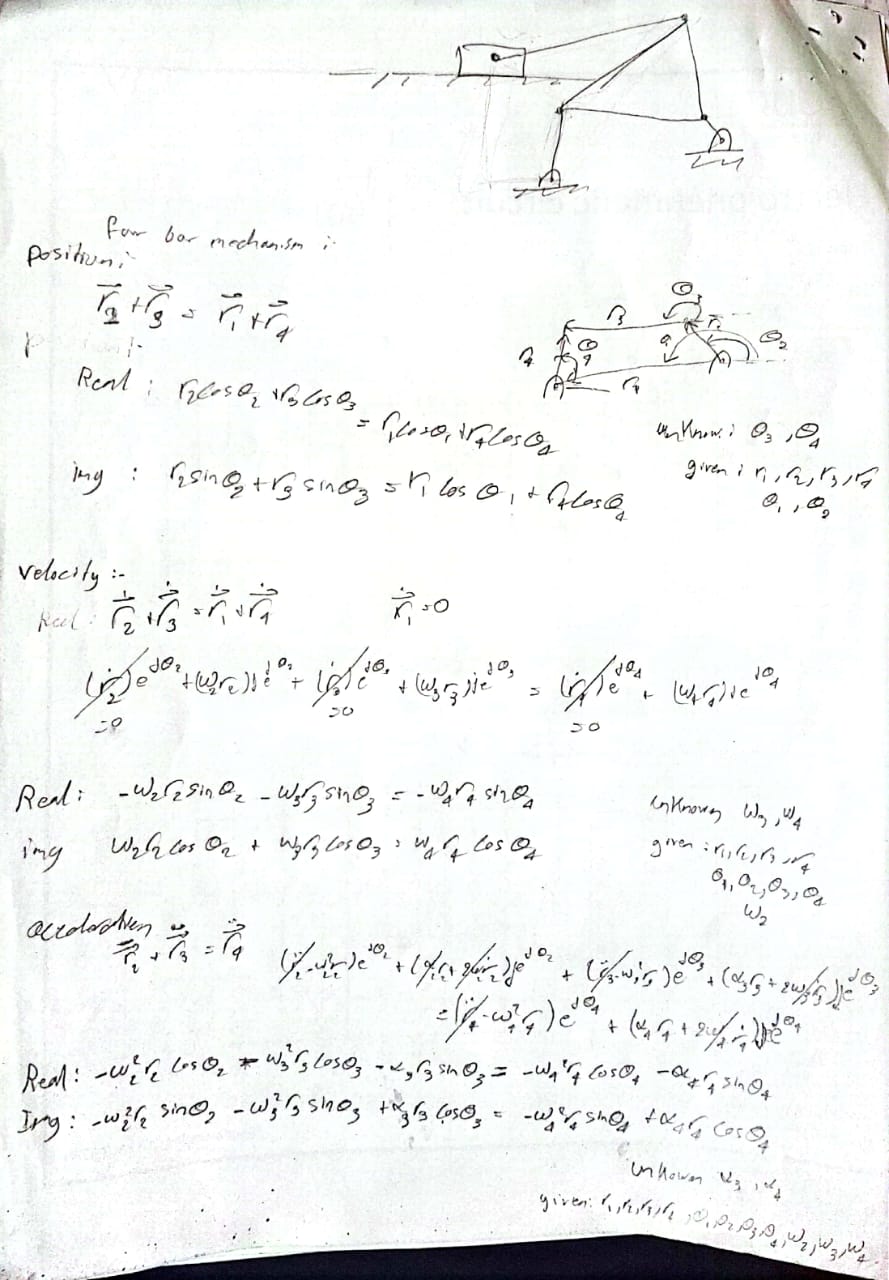
Description automatically generated

So for full analysis for postion ,velocity and acceleration we will have to divide it to :

1. Fourbar mechanism
2. Slider crank

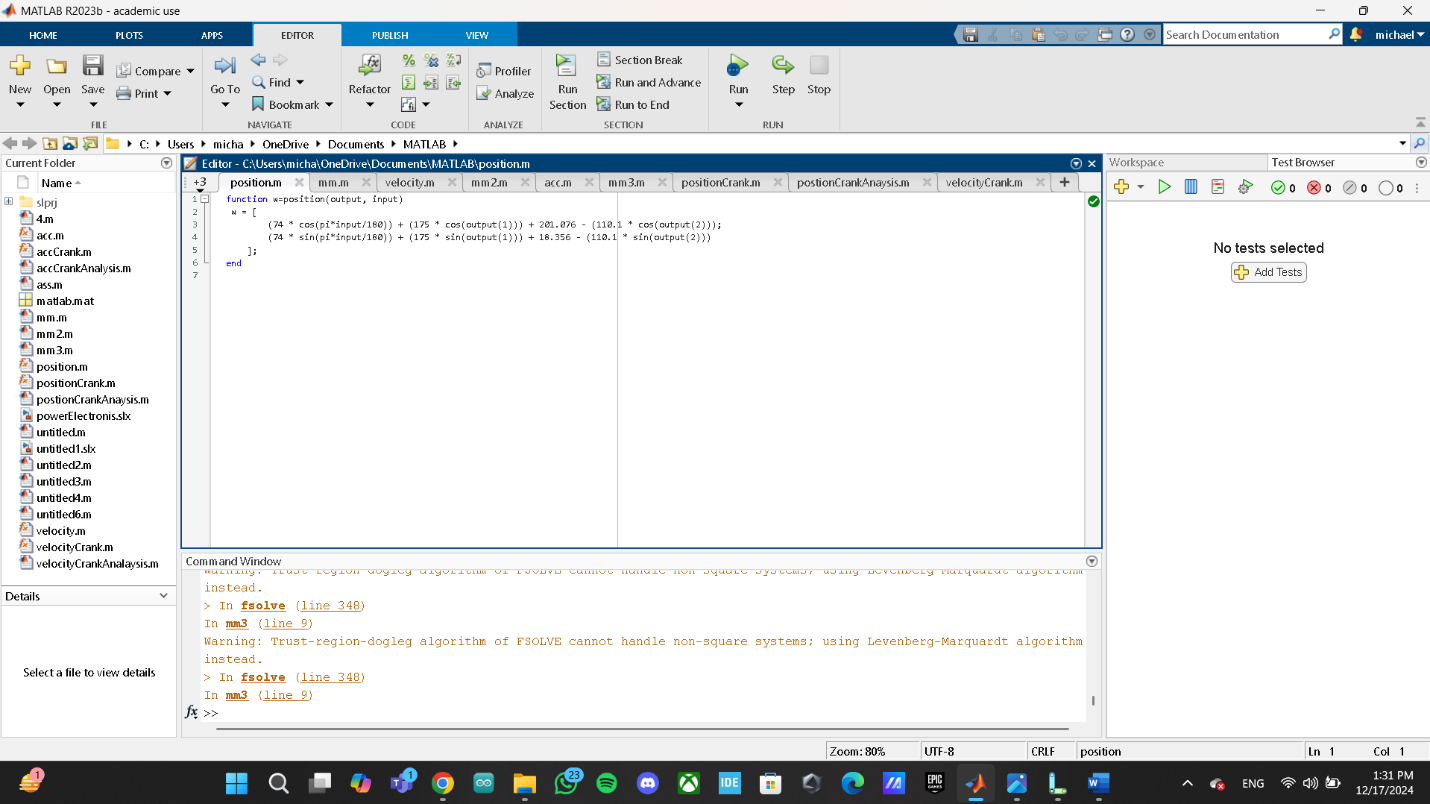
First. Fourbar mechanism:

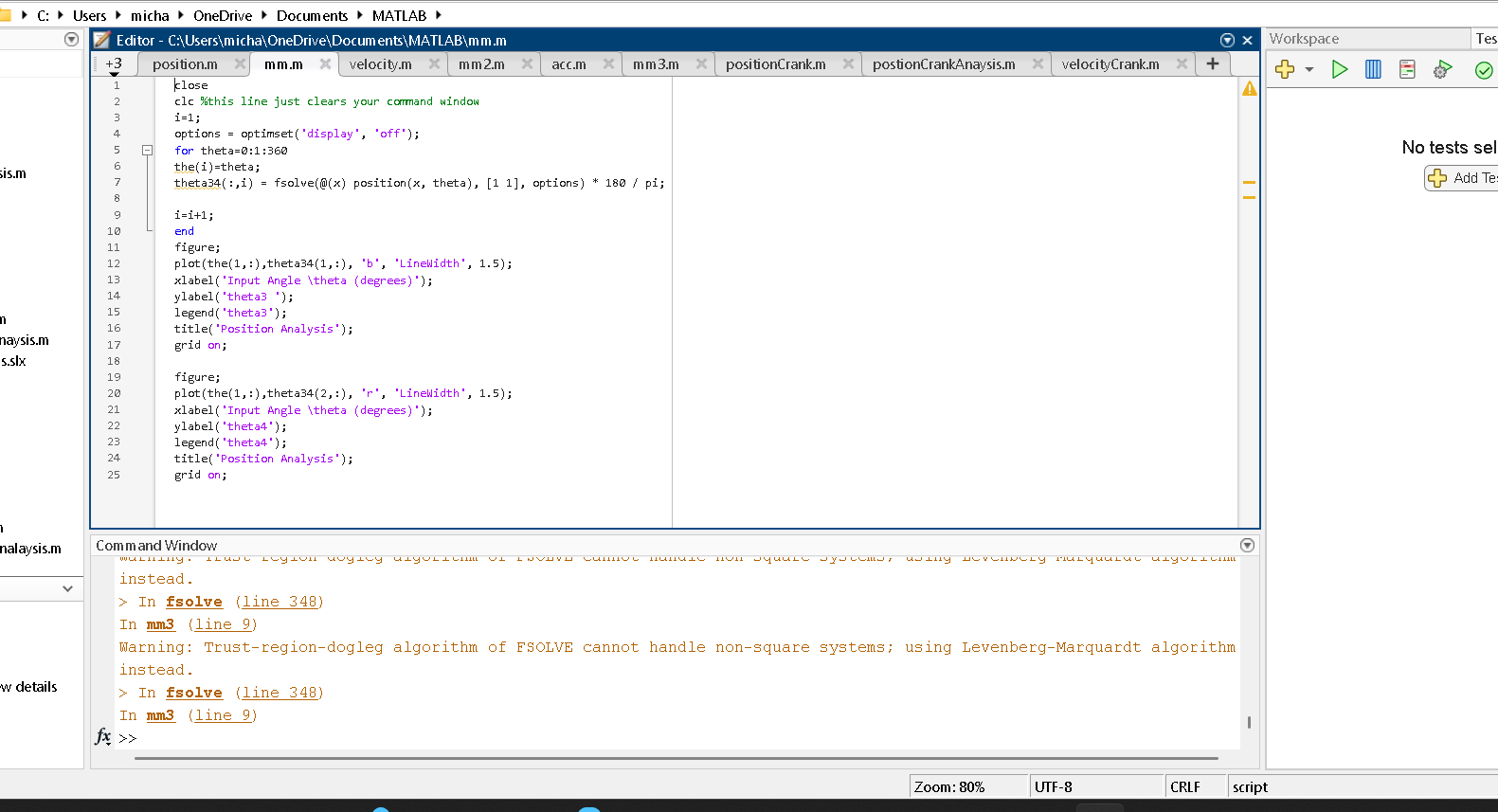
The kinematic equations using the analytical approach



**MATLAB files and Plot graphs:**

Position:





A screenshot of a computer

Description automatically generated

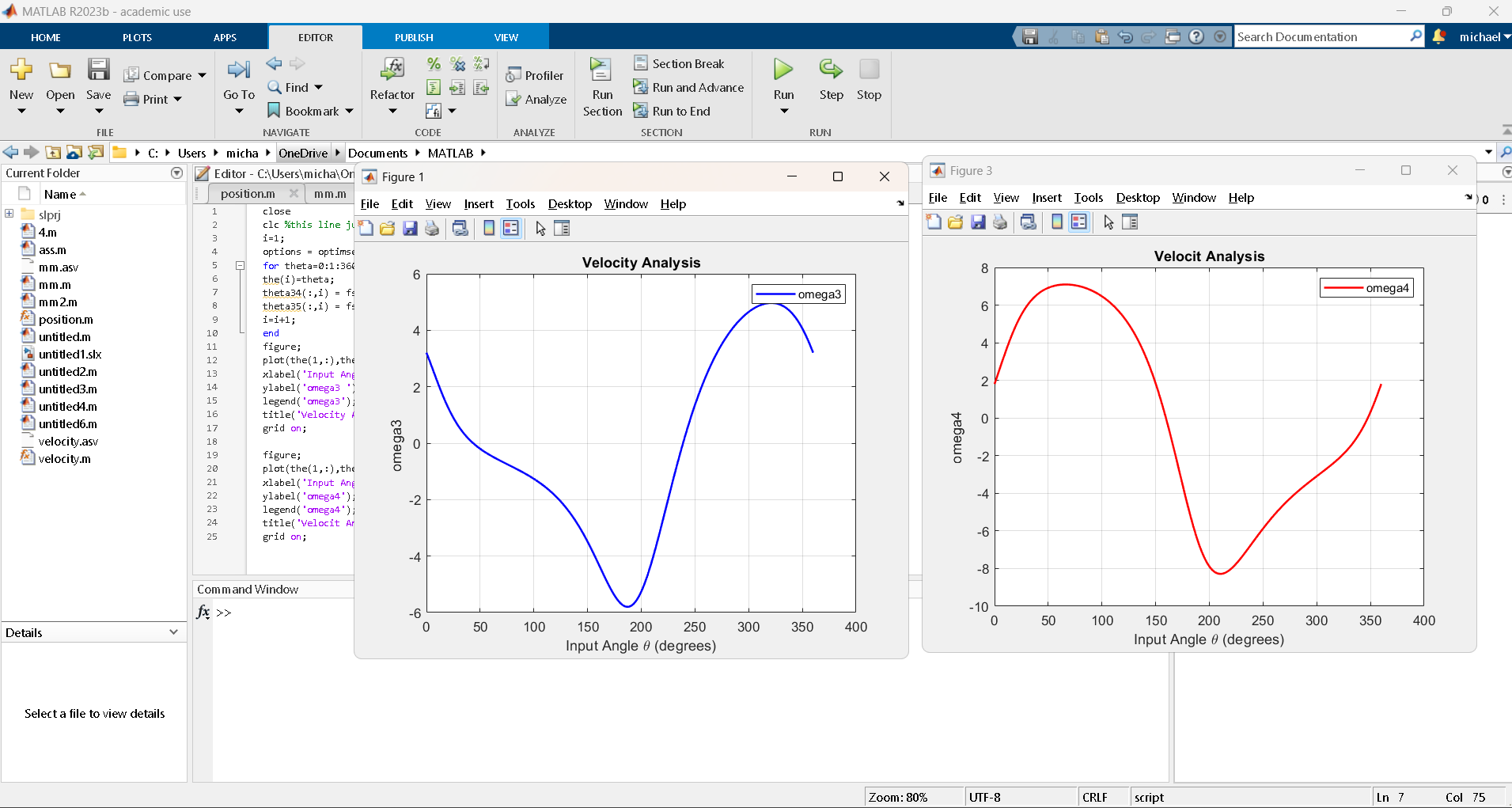
Velocity:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated



Acceleration:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

Second. Slider crank :

 The kinematic equations using the analytical approach:

A close-up of a paper with writing

Description automatically generated

**MATLAB files graphs:**

Position:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

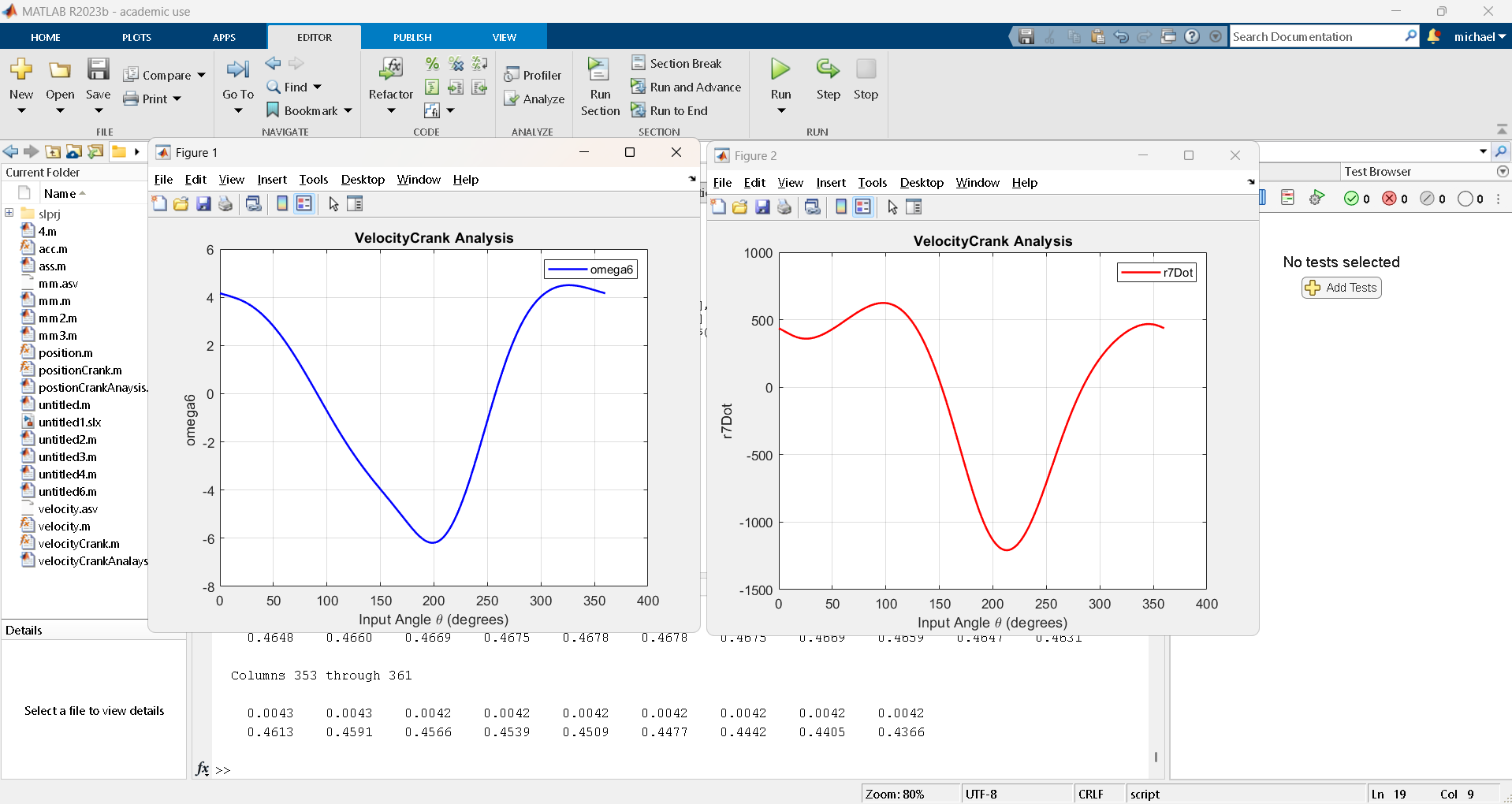
Velocity:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated



Acceleration:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

**The velocity and acceleration diagrams at the chosen angle:**

Theta = 90 degree

Velocity of four bar mechanism:

A maths paper with lines and numbers

Description automatically generated with medium confidence

Velocity of slider crank:

A diagram of a triangle

Description automatically generated

Acceleration of four bar:A diagram of a triangle

Description automatically generated with medium confidence

Acceleration of slider crank:

A paper with a diagram of triangles and points

Description automatically generated with medium confidence

**Comparison between the values obtained from the graphical, analytical, and software at the same input angle:**

for velocity, there is a small difference between the graphical solution and software output

as the graphical was

omega3 = 1.1428 rad/s omega4 = 6.811 rad/s

**A screenshot of a computer

Description automatically generated**

for velocity crank, there is a small difference between the graphical solution and software output

as the graphical was

R7dot = 620 cm/s omega6 = 0.1714 rad/s

**A screenshot of a computer screen

Description automatically generated**

for acceleration, there is a little big difference between the graphical solution and software output

as the graphical was

alpha4 = 15.34 cm/s^2 alpha3 = 12.57 rad/s^2

**A screenshot of a computer

Description automatically generated**

for acceleration crank, there is a little big difference between the graphical solution and software output

as the graphical was

R7DoubleDot = 4 m/s^2 alpha6 = 18.2 rad/s^2

**A screenshot of a computer

Description automatically generated**