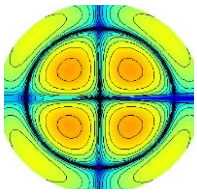

DOING PHYSICS WITH MATLAB

MATHEMATICAL ROUTINES

SOLVING QUADRATIC EQUATIONS

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DOWNLOAD DIRECTORY FOR MATLAB SCRIPTS

math_qe.m **math_qe.m_cal.m**

mscripts used to solve Quadratic Equations using a GUI

[sol_p sol_m] = eq_quadratic(a,b,c)

Function for finding the roots of a quadratic equation

THE QUADRATIC FUNCTION

A **quadratic function** has the general form

$$y(x) = a x^2 + b x + c \qquad a \neq 0$$

and its graph is a **parabola**.

If there are real values for *x* for which

$$y(x) = a x^2 + b x + c = 0$$

the curve will intersect the X-axis and the values of *x* are given by the formula

roots $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If $b^2 - 4ac < 1$ then there are no real roots or roots are imaginary numbers

If $b^2 - 4ac = 0$ then there is only one real root $x = -b/2a$

If $b^2 - 4ac > 0$ then there are two real roots.

A Matlab graphical user interface (GUI) can be used to solve a quadratic equation. The values of *a*, *b* and *c* and the roots of the quadratic equation are displayed in a Figure Window.

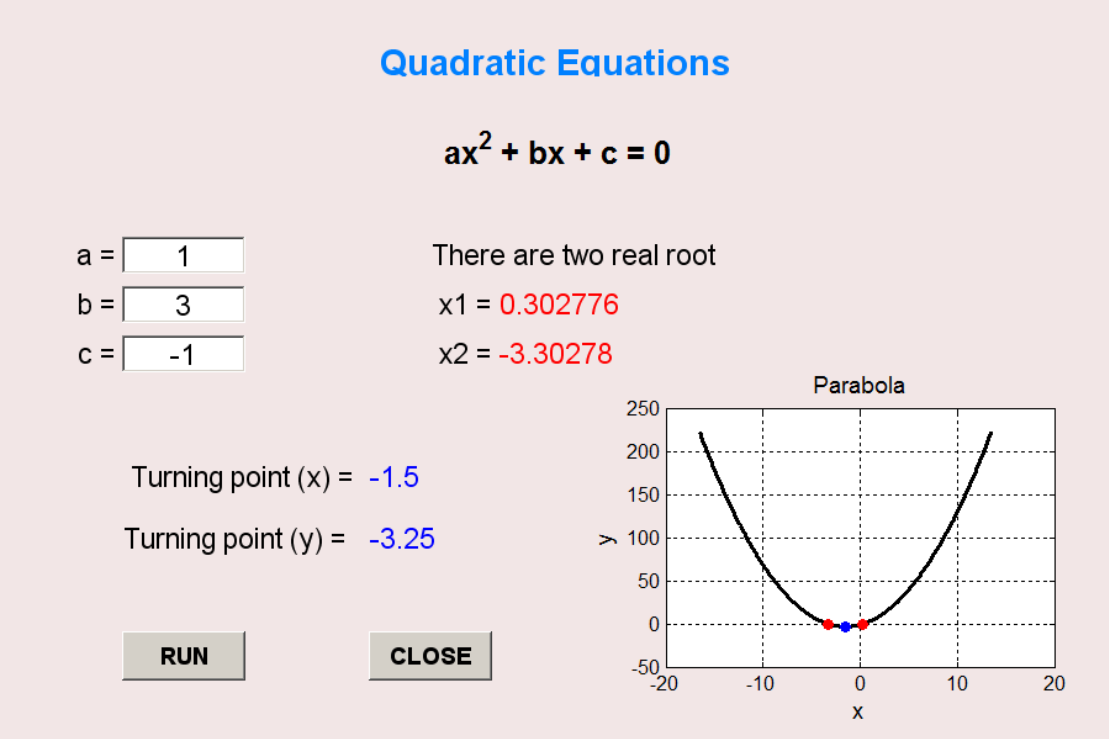

Figure Window created for the solving a quadratic equation using the mscripts **math_qe.m** **math_qe.m_cal.m**

The function **eq_quadratic(a,b,c)** can be used to find the roots of a quadratic equation from the Command Window or called within a mscript.

For example

```
[sol_p sol_m] = eq_quadratic(1,3,-1)
```

returns

sol_p = 0.3028 sol_m = -3.3028

The GUI is based upon the mscript written by A/Prof Hadi Khabbaz (University of Technology, Sydney)