

Quiz #2

LabVIEW

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Assignment is due in class on Thursday, February 9, 2012

Quiz #2: Strings

- Inputs:** One “stop” button.
Three numeric controls (A, B, C)
- Outputs:** Two string indicators for roots
- Operation:** You may download my “baseplate” to use as a starting point.

The user can adjust the values of the three numeric controls. LabVIEW will continuously solve the quadratic equation $Ax^2 + Bx + C = 0$, and display both roots x_1 and x_2 . Each of the two roots will be displayed using separate string indicators. Some roots will be real, some will be complex, and others will be imaginary. For example, an individual root might be: “4.00 + 2.00i”.

As a refresher, the solution to this equation varies depending on whether any of the coefficients are zero. Here are the six cases to consider:

I. $A \neq 0, B \neq 0, C \neq 0$ $\rightarrow x_1 = \frac{-B}{2A} + \frac{\sqrt{B^2 - 4AC}}{2A}$, and $x_2 = \frac{-B}{2A} - \frac{\sqrt{B^2 - 4AC}}{2A}$

II. $A = 0, B \neq 0, C \neq 0$ $\rightarrow x_1 = \frac{-C}{B}$, and $x_2 = \text{none}$

III. $A = 0, B = 0, C \neq 0$ $\rightarrow x_1 = \text{none}$, and $x_2 = \text{none}$

IV. $B = 0, A \neq 0, C \neq 0$ $\rightarrow x_1 = +\sqrt{\frac{-C}{A}}$, and $x_2 = -\sqrt{\frac{-C}{A}}$

V. $B \neq 0, C = 0, A \neq 0$ $\rightarrow x_1 = 0$, and $x_2 = \text{none}$
or $A \neq 0, C = 0, B \neq 0$

VI. $C = 0, A \neq 0, B = 0$ $\rightarrow x_1 = \frac{-B}{A}$, and $x_2 = 0$

Only cases I and IV can potentially have complex solutions. You may not use the LabVIEW complex variable type. A few common output errors look like this 3.0 ++ 2.0i; 3.0 + -2.0i; 3.0+2.0; nan.

