FROM TEACHERS FOR TEACHERS

TECHNOLOGIES IN STEM EDUCATION

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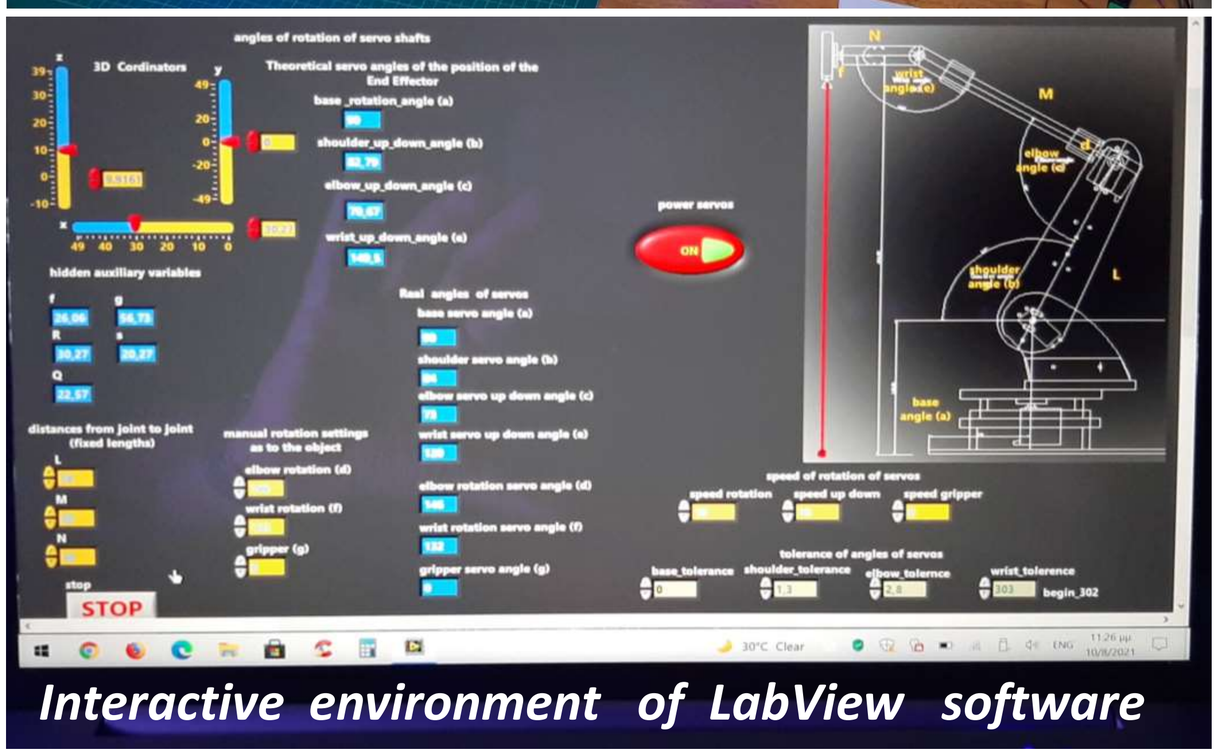
" the robotic arm as a representative teaching tool for STEM approaches "

*In this project is presented an effort to show how an impressive device as the robotic arm, can be done representative **STEM teaching tool.***

- ❑ *First of all, the **basic specifications** of the arm are defined, such as its type, work space, degrees of freedom (DOF), etc.*
- ❑ *Next comes the **design** of components and generally all moving and stationary parts.*
- ❑ *Then, coming the **mathematical calculations.** Using simple geometry and trigonometry, are **calculated the equations** of the joints angles, by solving the **inverse kinematic problem.***
- ❑ *The equations are then written in **code** in the excellent **LabView** software, in a graphical environment, that is more understandable to students.*
- ❑ *The **results** are transmitted to microcontroller of robotic arm, (**Arduino**) to move the servomotors of the joints at the **correct angles.** Thus, the end of the arm reaches the **desired point** in space **(X,Y,Z).***
- ❑ *Finally, the robotic arm **is made**,with 6 DOF using the **principles** and **rules** of **physics, engineering**, **technology** and **electronics.***

✓ *The code can be **changed,** giving the arm **new possibilities**, such as remembering the movements indicated to it manually and being able to repeat them. Thus, students appreciate and understand the **"importance"** and **"flexibility"** of the code.*

Robotic arms in action



Interactive environment of LabView software

Educational Benefits:

- ✓ *Teamwork but at the same time development of individual innovations.*
- ✓ *Growth students' perception and ingenuity.*
- ✓ *Finding solutions to real problems that arise.*
- ✓ *Dealing with new technologies and materials.*
- ✓ *Constructive acquisition of skills for measuring instruments and handling tools.*
- ✓ *Learning basic principles to write code in different environments.*

*The project provides a fulfill and impressively **STEM teaching approach**, with an emphasis on **problem analysis** and **coding**, where students will love it.*

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