TECHNICAL DATASHEET · SOFTWARE

Fuzzy Speed Control

PYTHON EDITION · NO MATLAB · CARIMO DCMK KIT

A pure-Python desktop application for **model-free Fuzzy Logic speed control** of the CARIMO DC Motor Kit. Students write a handful of plain-English rules and watch the motor follow, with no plant model and no equations. A PyQt6 dashboard provides **live control, a fuzzy inspector that shows the rules firing**, an experiment workbench and a reference generator. Validated on a live DC Motor Kit. No MATLAB, no toolbox licence.

Five guided experiments

1. **Step response.** The first closed-loop result.
2. **Membership-function tuning.** The error-set width.
3. **Load disturbance rejection.** With real magnetic disks.
4. **Rule base A vs B.** Two rule sets, head to head.
5. **Membership-function shape.** How shape drives behaviour.

Four tools in one app: Live Control, Fuzzy Inspector, Experiment Workbench (+ voice-cued Guided Load Test) and a Reference Generator.

System requirements	
Language	Python 3.11
Dependencies	PyQt6, scikit-fuzzy, SciPy, NetworkX, pyserial, NumPy, Matplotlib
MATLAB / toolbox	**Not required**
OS	Windows 10 / 11
Port	One free USB 2.0 port
Hardware	CARIMO DC Motor Kit (V1 or V2); speed targets up to 2000 RPM
Control	Speed loop · model-free fuzzy · live rule inspector
Reference	Step, staircase, ramp, sine or square targets

What's included

- ✓ **The PyQt6 app**: Live Control, Fuzzy Inspector, Workbench, Reference Generator
- ✓ **Reference generator** with five setpoint waveforms
- ✓ **Demo protocol** + hardware-validated experiment results
- ✓ **Perpetual software licence** with updates
- ✓ **Five experiments** + sub-experiments + a voice-cued guided load test
- ✓ **Fuzzy-vs-PI comparison** + master tables (fuzzy knob to PID intuition)
- ✓ **Runs on your own PC**, nothing leaves your network
- ✓ **Readable, editable Python** source, change any rule

Licensing & scope

Perpetual lab licence. The software is **pure Python** and needs **no MATLAB, Simulink or toolbox**. It runs on the user's own PC and is licensed separately from the hardware. The **CARIMO DC Motor Kit** is sold separately. Fuzzy Speed Control is also available as a **Simulink edition** (Fuzzy Logic Toolbox), and PI/PID and MPC editions run on the same kit.