

Lab 11

Fuzzy system for the Car Monitoring Problem

Figure 11.1 shows a fuzzy quantization of the parameters of the task. The parameter "brakes' response" is represented here on the universe of time with three linguistic labels—"quick," "normal," and "slow." The state of the cooling system is represented by three linguistic fuzzy values—"underheating," "normal," and "overheating." The status of the temperature gauge is represented by two labels—"OK" and "damaged"—on the universe of grades of sensitivity of the gauge. The variable "temperature" is represented by the labels "low," "normal," and "high." The conclusion "stop the car," can be represented as a single-valued membership function representing the certainty of the advice. A chain fuzzy inference is performed in this case. When the system is realized by the use of the centroid defuzzification inference method, even slight matching of the conditions in the fuzzy rules by the current status of the car will cause a message to be communicated to the driver. The fuzzy rules are:

Rule 1: IF Brakes'_response is Slow, THEN Message is Stop_the_car

Rule 2: IF Cooling_status is Overheating, THEN Message is Stop_the_car

Rule 3: IF Temperature is High and Gauge_status is OK, THEN Cooling_status is Overheating

Define fuzzy variables and rules into MATLAB or FuzzyCLIPS. Test them.

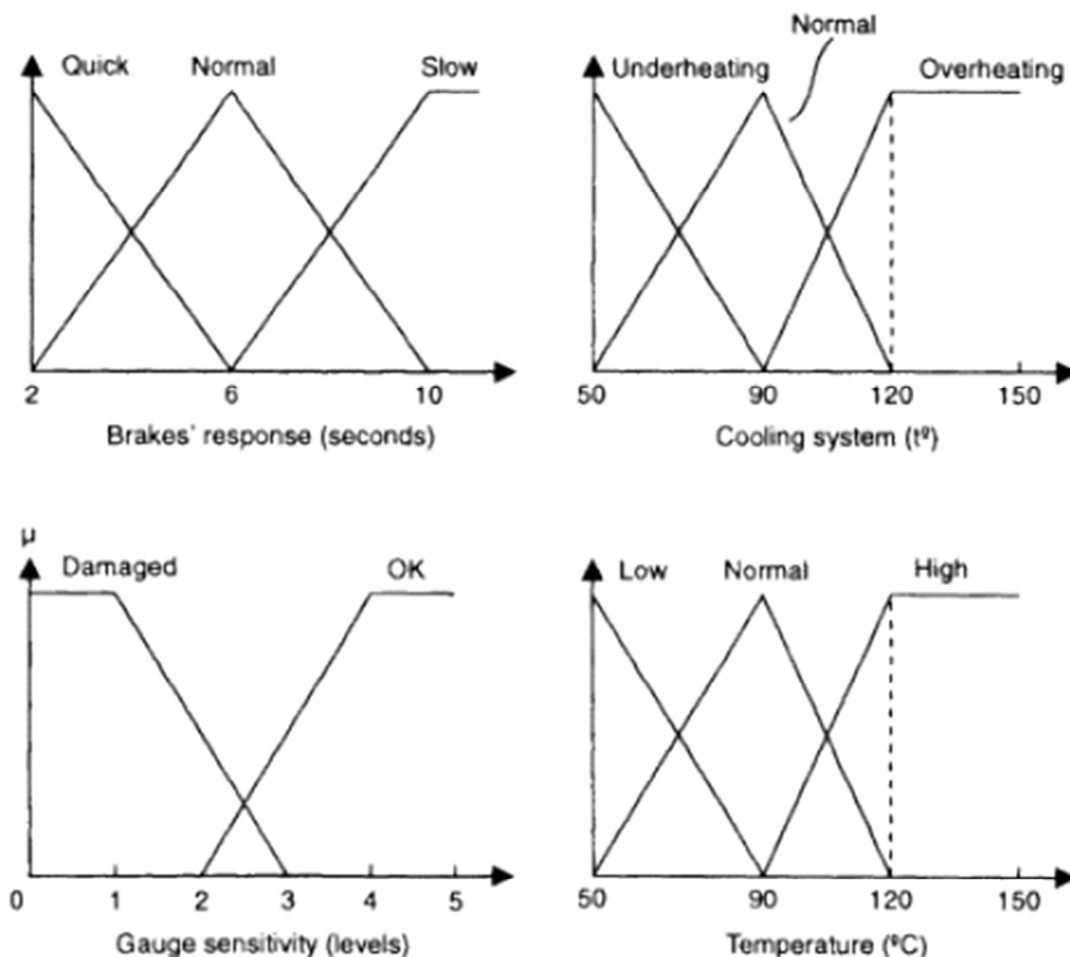


Figure 11.1 Membership functions of linguistic values for the Car Monitoring Problem.