



Control of Linear Servo Pneumatic Drive Based on Fuzzy Controller and Knowledge Base

E. L. Khaziev^(✉)

Naberezhnye Chelny Institute, 68/19, Prospect Mira,
Naberezhnye Chelny, Russian Federation
emilius@yandex.ru

Abstract. The study is devoted to the control system of a linear pneumatic actuator based on fuzzy logic with the ultimate task of improving the quality of control indicators, namely the positioning accuracy at intermediate points of possible displacements, while maintaining high performance. Fuzzy inference techniques are widely used in the development of fuzzy controllers. The primary purpose of the fuzzy controller is to control an external object where the behavior of the managed object is described by fuzzy rules. Fuzzy logic controllers are the most important application of the fuzzy set theory. Their functioning differs from that of ordinary controllers by the fact the knowledge is used to describe the system instead of differential equations. The automated pneumatic actuator control system based on a fuzzy controller should be based on a knowledge base containing fuzzy frames (rules). The formation of this base is carried out on the basis of the knowledge of experts or the method of direct measurement with the help of control equipment.

Keywords: Pneumatic actuator · Control system · Servo mode · Adaptive mode · Fuzzy logic · Fuzzy controller · Knowledge base

1 Introduction

The construction of a system tracking control based on fuzzy logic allows to simplify the structure elements of the system, and also gives a discrete nature control method some continuous properties, which should enhance governance and reduce the volume of the knowledge base.

Fuzzy logic allows you to enter the tracking management of a certain well-known (a priori) information about the object in the form of fuzzy frame control, proximity to the natural shape of the language allows you to easily get the required knowledge from the experts. A priori information provides one of the main initial conditions of a system constructed according to the method of tracking control, the maximum condition of the initial adaptation.