

FUZZY LOGIC (TYPE-1) AND ITS APPLICATION IN ROBOTICS

G C Nandi, Professor, IIT-Allahabad

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Abstract

Fuzzy logic is a logic which is not fuzzy but is a very powerful logic which can address the Fuzziness of the environment. If judiciously applied, it can effectively model many complex nonlinear systems which otherwise are difficult to model. The present lecture will introduce the concept of Fuzzy logic. Subsequently, the Fuzzy Expert system development concepts will be presented. Its application on nonlinear control will be discussed with special references to the biped humanoid robot locomotion control. Developing a mathematical model based controller for the biped humanoid robots is extremely difficult because of its higher degrees of freedom, nonlinearity and inherently unstable structure. We have recently developed a hierarchical fuzzy logic system using Fuzzy Inference System1 (FIS1) and Fuzzy Inference System2 (FIS2). We have defined the rule based on the linguistic variable consisting of Force applied and the direction of motion (DoM) in roll and pitch direction. The audience will be exposed to this development as an application scenario of type -1 Fuzzy logic for humanoid push recovery.

