2017 IEEE SMC Distinguished Lecture Topics
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Lecture 1: Unknown Input Method Based T-S Fuzzy System Design.

This lecture covers the basic concept of the unknown input method and expresses the characteristics of the unknown input method. The method is then applied to design observer and controller for uncertain T-S fuzzy systems. The main merit of the unknown input method is to eliminate the influence of the uncertainty in the system without its bounded conditions. There are many types of T-S fuzzy systems to be considered below.

1. Continuous time system with uncertainty, and **single output** matrix or **multiple output** matrix,

2. Discrete time system with uncertainty and **single output** matrix or **multiple output** matrix, and **measurable** or **un-measurable** premise variables.

In the lecture, select useful new methods are presented for synthesis of the observer and/or controller in the T-S fuzzy system as above. The numerical example simulations and practical system simulations are also be presented.

Lecture 2: Introduction of the Robots in the Lab of NCU, Taiwan

This lecture will introduce several types of robot which are designed and manufactured in one of the most advanced robotics labs in Taiwan. The design and functions of each robot will be presented in detail. Those robots are as follows.

1. People-following robot, which can follow the walking people, avoid obstacles and take elevator autonomously.

2. Table tennis picker robot, which can recognize ping-pong balls and go forward to it and pick it up autonomously.

3. Human robot, which can keep balance to make many postures and do many actions.

4. Hexapod robot which can walk with six legs or four legs and transform to a wheeled robot. Furthermore it can up-side down hangs under iron grid and moves forward to any direction.

5. Jumping robot, that can jump up the stairs and also run on wheels. Furthermore, it

can serve as the family monitor for emergence rescue.

6. Other interesting robots.