



SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Department of Biomedical Engineering

Course Name: Control Systems

III Year : V Semester

Unit I –INTRODUCTION TO PHYSIOLOGICAL MODELING

Topic : Physiological Control System



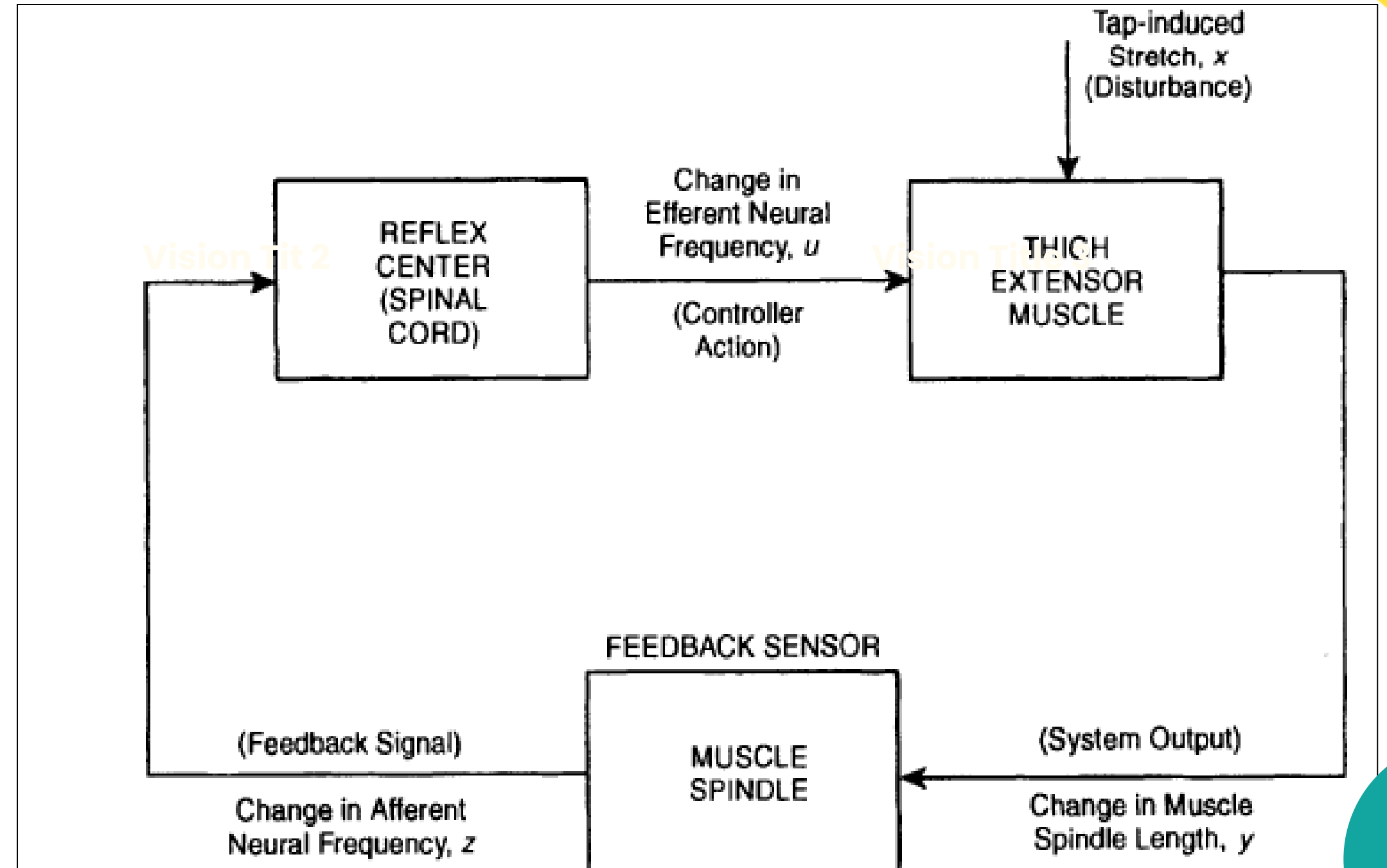
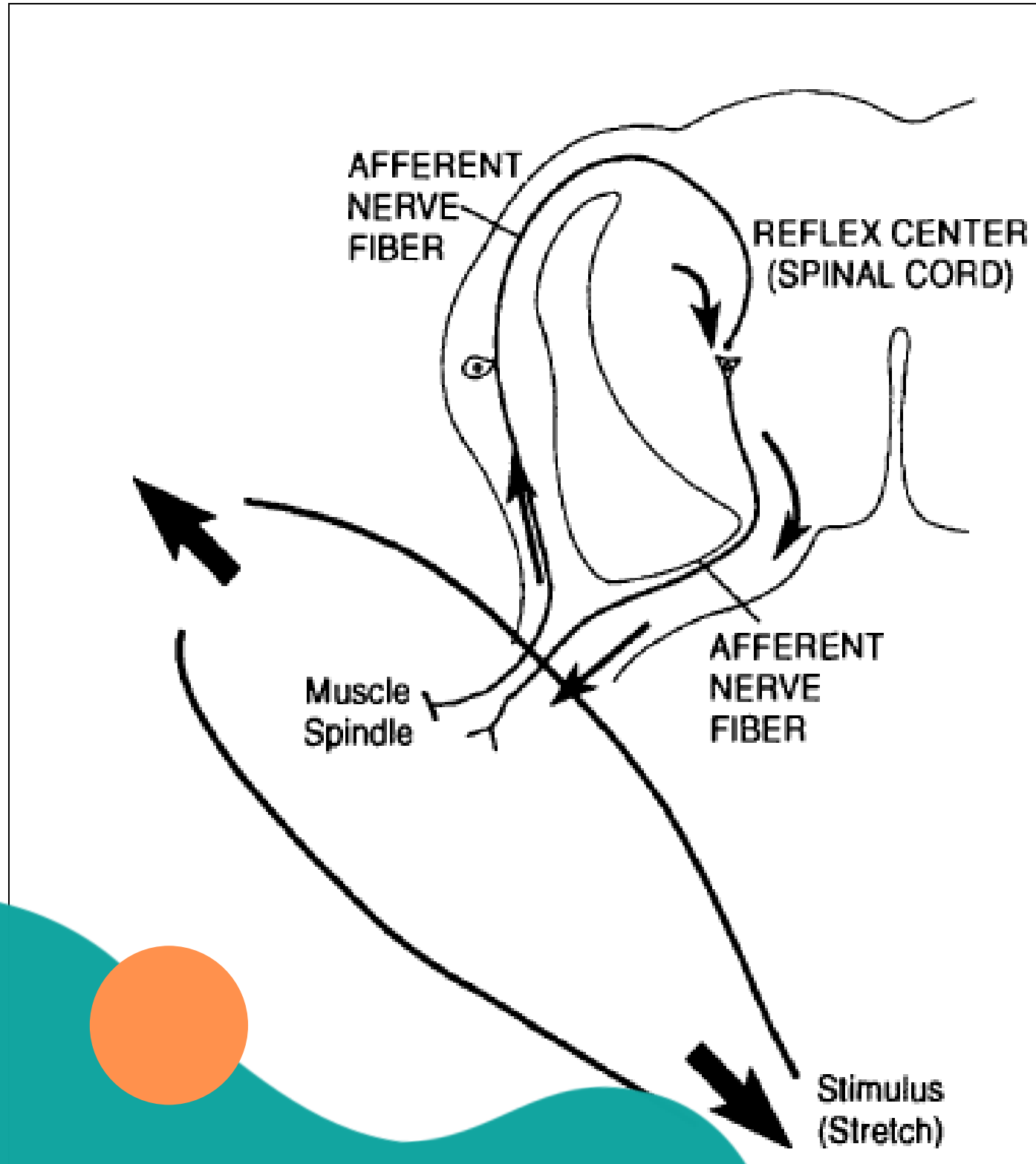
Introduction



- One of the simplest and most fundamental of all physiological control systems is the muscle stretch reflex.
- The most notable example of this kind of reflex is the kneejerk.
- A sharp tap to the patellar tendon in the knee leads to an abrupt stretching of the extensor muscle in the thigh to which the tendon is attached.
- This activates the muscle spindles, which are stretch receptors. Neural impulses, which encode information about the magnitude of the stretch, are sent along afferent nerve fibers to the spinal cord.
- Since each afferent nerve is synaptically connected with one motor neuron in the spinal cord, the motor neurons get activated and, in turn, send efferent neural impulses back to the same thigh muscle.



Introduction





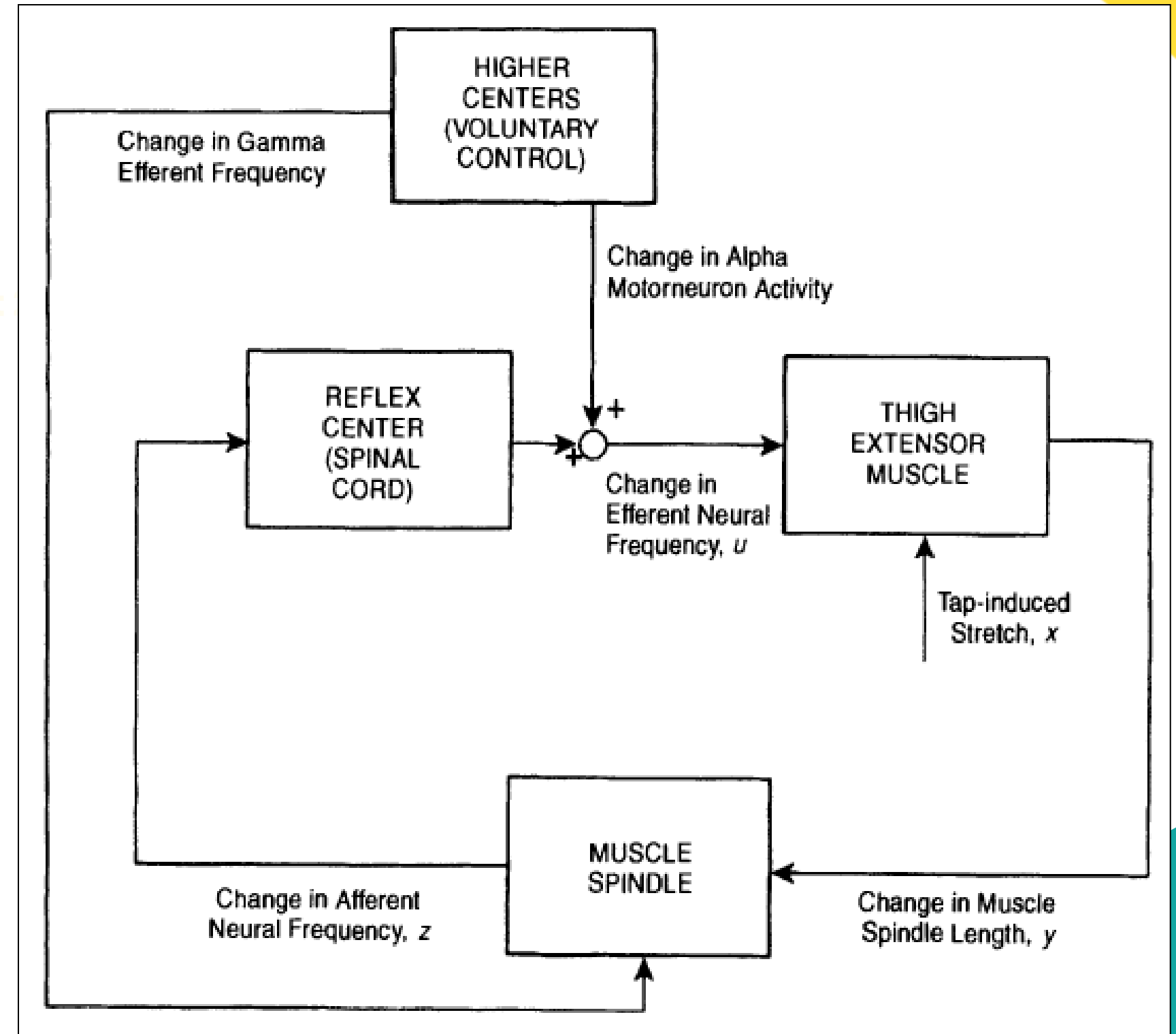
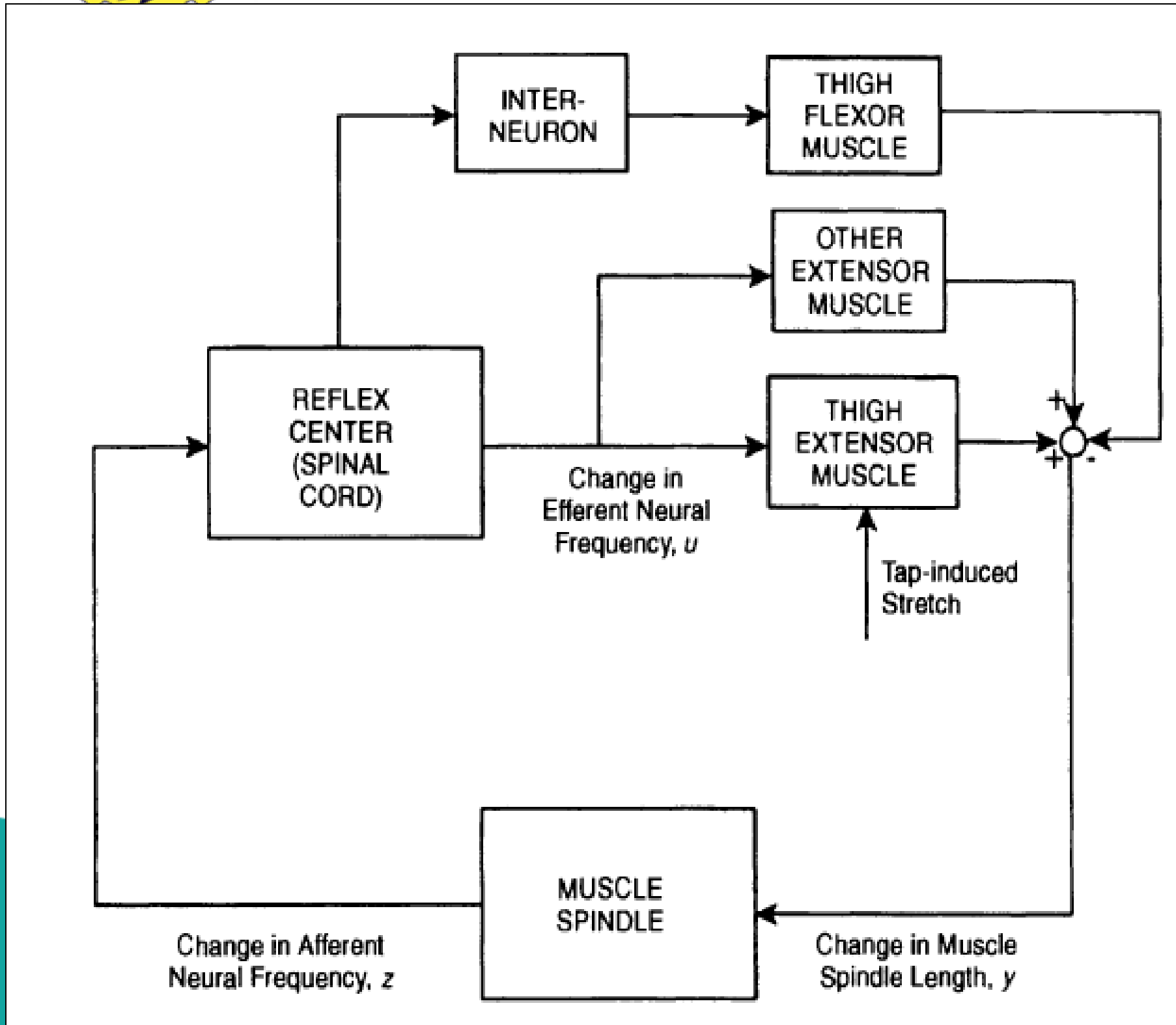
DIFFERENCES BETWEEN ENGINEERING AND PHYSIOLOGICAL CONTROL SYSTEMS



- An engineering control system is designed to accomplish a defined task, and frequently, the governing parameters have been fine-tuned extensively so that the system will perform its task in an "optimal" manner. **In contrast, physiological control systems are built for versatility and may be capable of serving several different functions.**
- The engineering control system is synthesized by the designer, the characteristics of its various components are generally known. **On the other hand, the physiological control system usually consists of components that are unknown and difficult to analyze.**
- There is an extensive degree of cross-coupling or interaction among different physiological control systems.
- Physiological control systems, in general, are adaptive. This means that the system may be able to offset any change in output not only through feedback but also by allowing the controller or plant characteristics to change.



Basic Elements of Block Diagram





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Thank You