SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

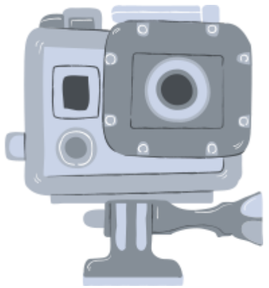
DEPARTMENT OF BIOMEDICAL ENGINEERING

COURSE NAME: 19BMT301/ BIOCONTROL SYSTEM

III YEAR / V SEMESTER

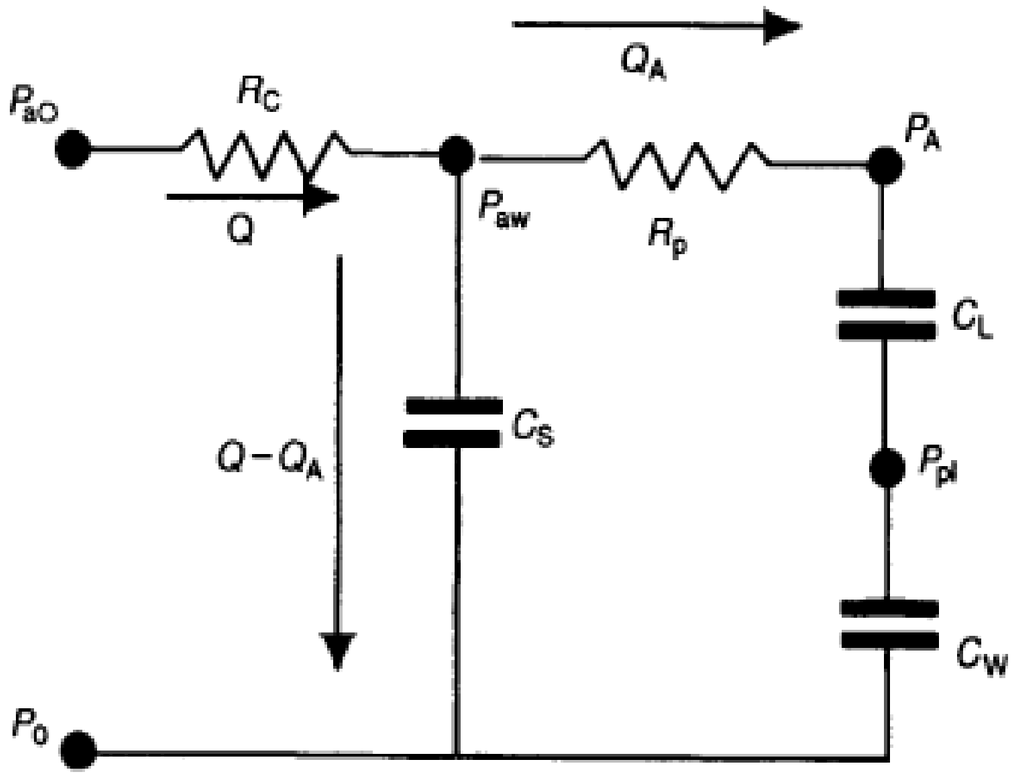
Unit 4 – Modelling of Biological System

Topic 2: Lumped Parameter Vs Distributed Parameter



Linear Model of Physiological System

Linearized description of lung mechanics:



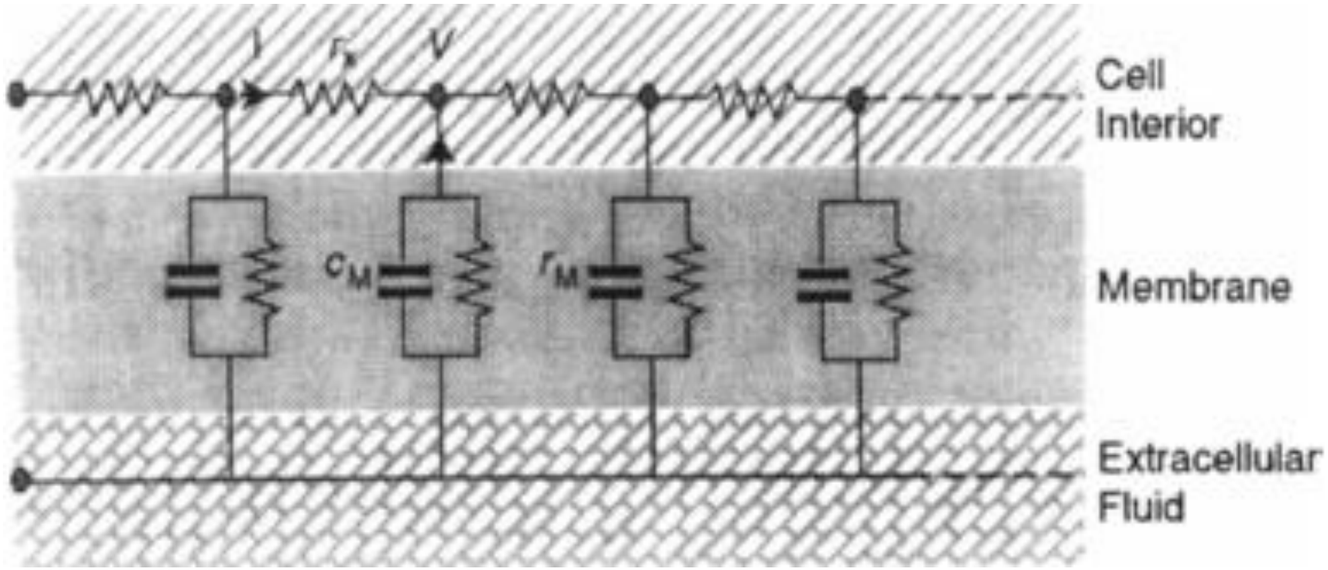
•The airways are divided into two categories: the larger or central airways and the smaller or peripheral airways, with fluid mechanical resistances equal to *Rc and Rp,* respectively.

•Air that enters the alveoli also produces an expansion of the chest-wall cavity by the same volume. This is represented by the connection of the lung (C_L) and chest-wall (C_w) compliances in series.

Lumped Parameter

- A given property of the model is assumed to be "concentrated" into a single element.
- The total resistance of the central airways is "lumped" into a single quantity, Rc , even though in reality the central airways are comprised of the trachea and a few branching generations of airways, each of which has very different fluid mechanical resistance.
- Similarly, a single constant, C_L, is assumed to represent the compliance of the lungs, even though the elasticity of lung tissue varies from region to region.
- In order to provide a more realistic characterization of the spatial distribution of system properties, it is often useful to develop a distributed-parameter model.

Distributed Parameter



SUMMARY

Definition, Macro and Micro Economics, Nature and Scope of Economics

ASSESMENT

Dear student,

Quiz is posted in your Google class room

Allotted time for quiz is 5 min

No of Questions is 10

KEEP
LEARNING..

Thank u

SEE YOU IN NEXT CLASS