EENG307: Lecture 14 Handout

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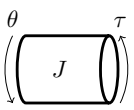
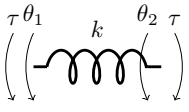
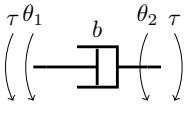
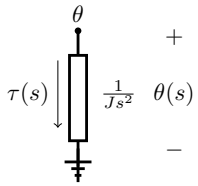
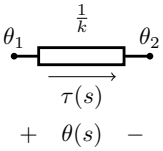
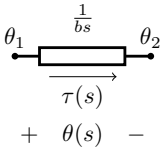
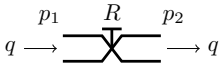
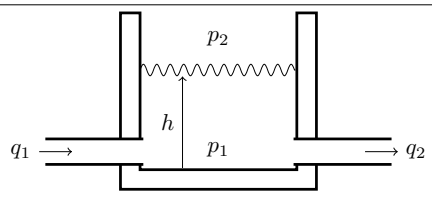
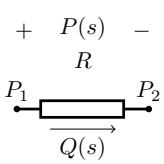
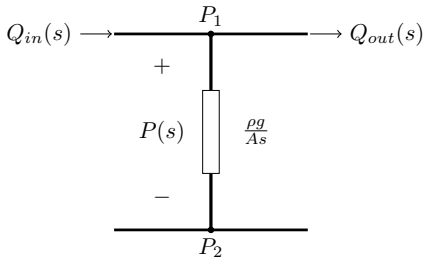
1 Impedance Tables

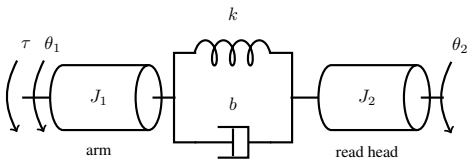
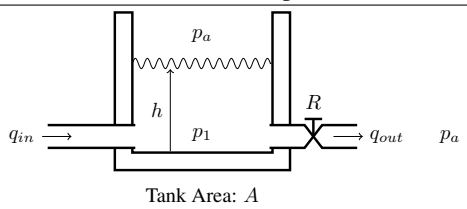
Rotational Mechanical Systems

	mass	spring	damper
Component		 $\theta = \theta_1 - \theta_2$	 $\dot{\theta} = \dot{\theta}_1 - \dot{\theta}_2$
Impedance Component (force direction agrees with positive direction)			

Fluid Impedances

	valve	tank
Component	$p = p_1 - p_2$ 	 Tank Area: A
Impedance Component		

*Developed and edited by Tyrone Vincent and Kathryn Johnson, Colorado School of Mines, with contributions from Salman Mohagheghi, Chris Coulston, Kevin Moore, CSM and Matt Kupilik, University of Alaska, Anchorage

	Rotational Mechanical Example	Fluid Example
Sketch an equivalent impedance network for the systems represented by:		
Step 1: Identify all necessary nodes		
Step 2: Sketch all nodes, including a ground node		
Step 3: Connect all elements, both passive and active (source), between the nodes they connect. Label impedances.		

In both cases, Step 4 would then usually be to use impedance rules (parallel, series, voltage division, and current division) to find the relevant transfer function(s).