

# Homework 1

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**Due date: Sep. 10, 2018**

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## 1. Transposition of Linear Signal-Flow Graph (SFG)

Linear SFGs can be transformed into different forms while maintaining the same system functions. Transposition is one of these transformations. A system can be transposed by reversing all edges and exchanging input and output. Prove that, for Single-Input Single-Output (SISO) systems, transposition of SFG gives the same transfer function as the original systems.

## 2. Properties of Greatest Common Divisor (GCD)

Prove the properties of GCD.

- $\text{GCD}(a, b) = \text{GCD}(b, a-b)$  when  $a > b$
- $\text{GCD}(a, b) = \text{GCD}(b, a \bmod b)$  when  $a > b$
- $\text{GCD}(a, b) \cdot \text{LCM}(a, b) = a \cdot b$

## 3. Submission

- ✓ **Due date: Sep. 10 (Mon.) 13:00**
- ✓ Submit your report in class.