Block diagram transformations

Transformation rules

Transformations below do not change the transfer function of the diagram. Left and right versions in each figure are equivalent.

Figure 1: Concatenating two or more blocks

Figure 2: Moving a block before a pickoff point

Figure 3: Moving a block after a pickoff point

Figure 4: Moving a block after a summation point

Figure 5: Moving a block before the summation point

Figure 6: Eliminating a feedback loop. Note the change from $\pm$ to $\mp$

Practice tasks

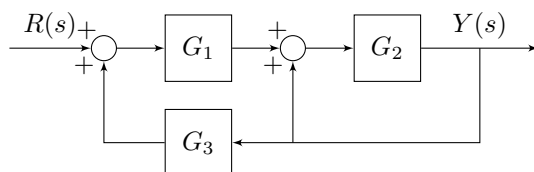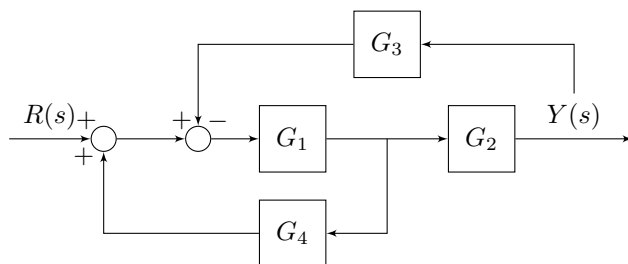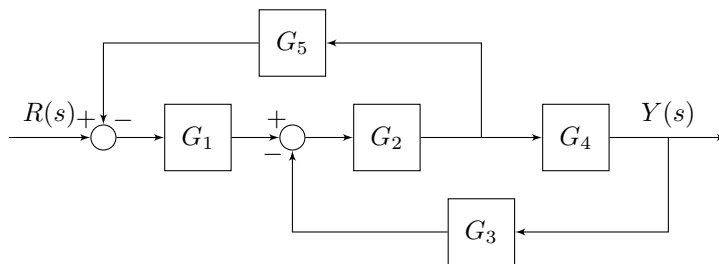Perform block diagram reduction and determine the single transfer function $\frac{Y(s)}{R(s)}$

Figure 7: Task 1
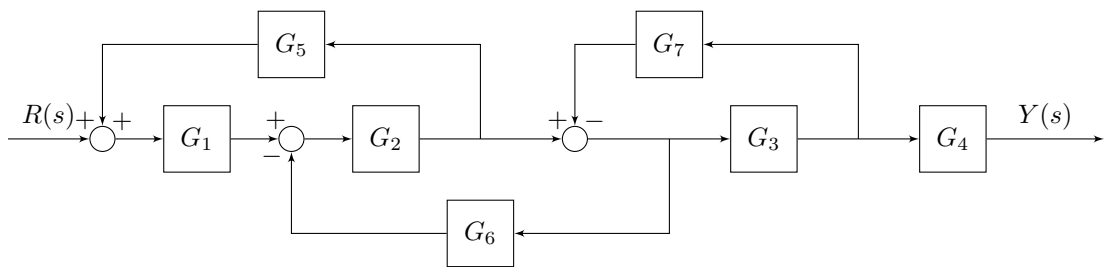

Figure 8: Task 2

Figure 9: Task 3

Figure 10: Task 4