

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 $\frac{Y(s)}{R(s)}$.
 Tasks marked "extra" are of harder difficulty than what would appear on the test.

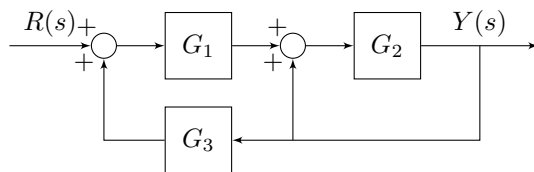


Figure 7: Task 1

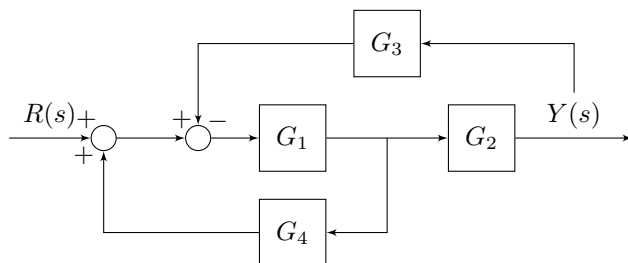


Figure 8: Task 2

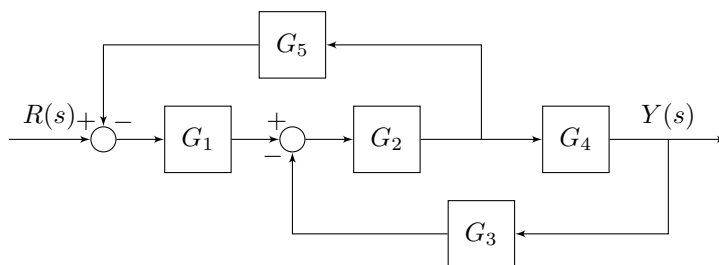


Figure 9: Task 3

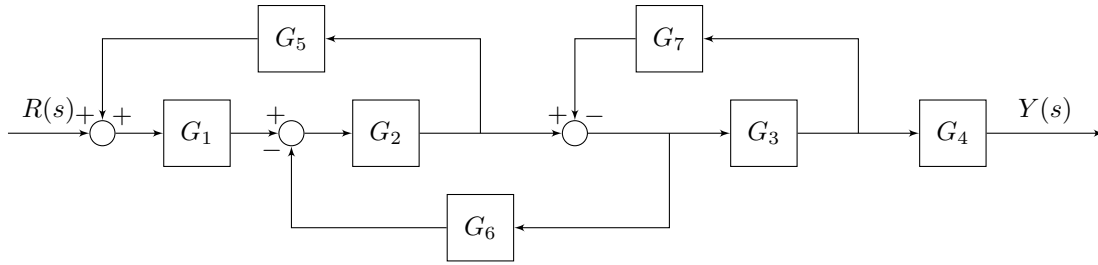


Figure 10: Task 4

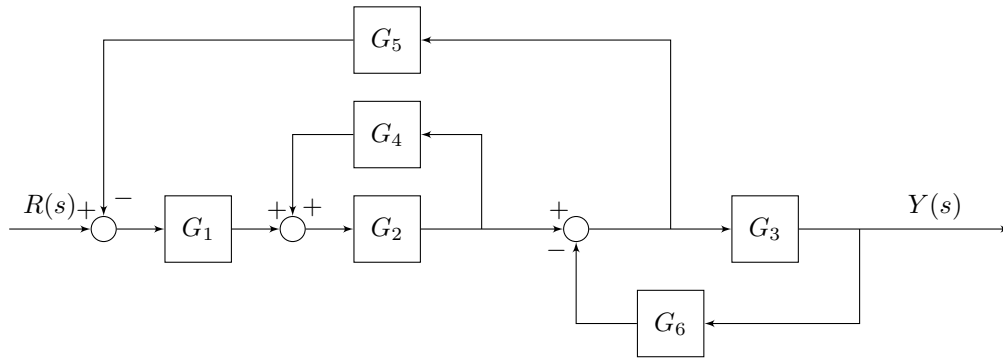


Figure 11: Task 5

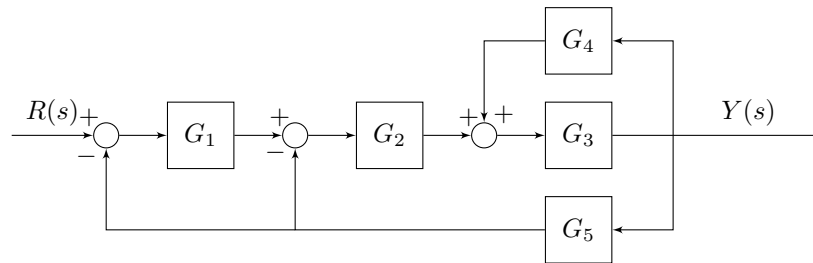


Figure 12: Task 6

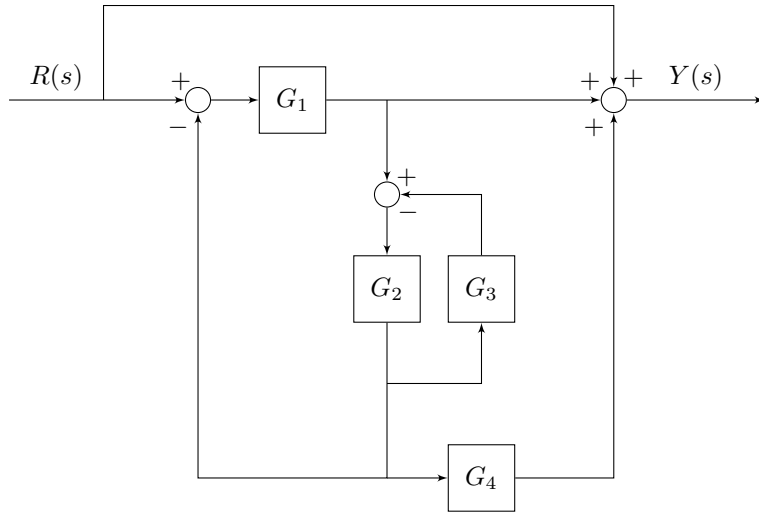


Figure 13: Task 7 - extra

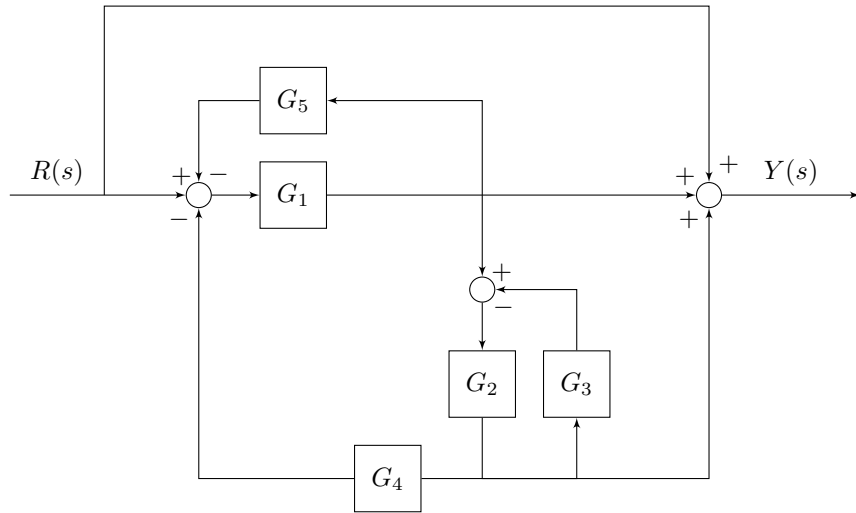


Figure 14: Task 8 - extra