

**CM20019—COMPUTATION III:
FORMAL LOGIC AND SEMANTICS
EXERCISE SHEET 3, 15.10.2007**

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Problem 1. Find a substitution σ for each of the following equations:

- (1) $(X + Y)\sigma = (Y + Y)$;
- (2) $(X + Y)\sigma = (Y + Z)$;
- (3) $(X + Y)\sigma = ((X + Y) + (X + Y))$.

Problem 2. Show two substitutions σ and τ such that $\sigma \circ \tau \neq \tau \circ \sigma$.

Problem 3. Find a substitution σ and a substitution τ such that the following two equations are true:

- (4) $(X + (Y + Z))(\sigma \circ \tau) = (Y + (Z + X))$,
- (5) $Z\tau = Y$.

Problem 4. Find a substitution σ such that $((\sigma \circ \sigma) \circ \sigma) \circ \sigma = \sigma$.

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The web page for the course is at [1]. You can find other exercises in Dan Richardson's notes, available from the web page.

References

1. Alessio Guglielmi, *CM20019—Computation III: Formal logic and semantics*, <http://cs.bath.ac.uk/ag/CM20019>, 2007.