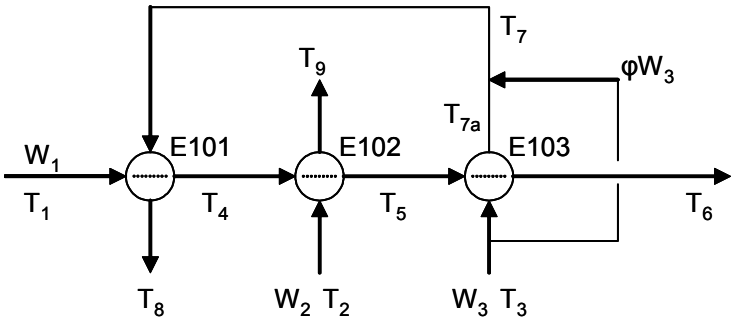
Problem Set 8: alternative HX network RGA and DC

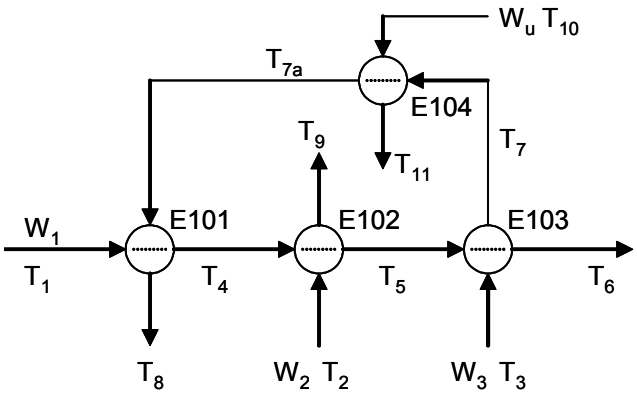
For this problem set, work with one or two names will be accepted.

In PSet 7, you designed 2 alternative HX networks:

bypass



trim HX



For each of your network designs,
(1) compute the RGA and select the most promising pairing of CV and MV.
(2) compute the DC for all combinations of -, 0, + variations of the four disturbance variables. Identify the worst disturbance conditions. Verify that your manipulated variables are sized to overcome the disturbances.

As before:
all heat capacities 2500 J kg^{-1} K^{-1}
all heat transfer coefficients 250 W m^{-2} K^{-1}
(inputs) W_{1r}: 8.2 kg s^{-1} T_{1r}:250°C
T_{2r}:136°C
T_{3r}:100°C
T_{10}: 180°C (we will presume that T_{10} is not disturbed from this value)
(outputs) T_{6r}: 129.3°C
T_{8r}: 223.4°C
T_{9r}: 168.8°C

It may happen that a design decision you made in PSet 7 will prove in PSet 8 to be unworkable. In this case, RGA and DC are telling you something useful, and you may change your design to improve matters.

