

Integrated Process Water Networks Design Problem

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Problem Statement

In the integrated process water networks design problem, we are given a set of single/multiple water sources $s, s \in SW$, with/without contaminants $j, j \in J$, a set of water-using units $p, p \in PU$ which generate a set of contaminants $j \in J$, and wastewater treatment operations $t, t \in TU$ for removing the contaminants. The goal of this problem is to find the interconnections, flowrates and contaminants concentration of each stream in the water network which will minimize the total annual cost of the water network while satisfying the maximum contaminant concentrations in the discharged stream to the environment. The problem is based on the following assumptions: the number of water sources is fixed, the number of water-using and water treatment operations is fixed, the flowrates through the water-using process operations are assumed to be fixed but can also be treated as continuous variables to model mass transfer operations in the proposed model, the network operates under isothermal and isobaric conditions.

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