Realizing a Steady Total Outflow from Multiple Reservoirs with Varying Inflows

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We consider the following problem: Given a number of reservoirs of varying size with time-varying inflows, can a steady or nearly steady outflow be realized? One example where the problem occurs is when multiple sewer systems share one Waste Water Treatment Plant (WWTP) and it is necessary to limit the variation in the flow into the WWTP. Another example of the problem would be flow regulation in a river with multiple tributaries that contain reservoirs where we can control the outflow. We examine what can be said about relation between available storage volume, reservoir inflow variation and the effects of restrictions on the range of reservoir outflow rates. Two algorithms to realize a steady total flow are tested. One algorithm uses Branch and Bound and 24 hour look ahead. The other algorithm uses a form of set-point tracking.