Florida International University
Department of Civil and Environmental Engineering

Homework 4

Optimization in Water Resources Engineering, Spring 2020
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For this homework you will use at least two different optimization algorithms and one of them needs to be an evolutionary algorithm.

Consider the river system illustrated in Fig. 1. The system contains one reservoir (Toktogul reservoir in Kyrgyzstan) and two irrigated zones (one in Uzbekistan and one in Kazakhstan). Four different crops can be grown in each irrigation zone: cotton, wheat, rice, and Lucerne. The profit per hectare (ha) for each crop is shown in Table 1 along with the maximum crop areas and the crop water requirements. The capacity of the reservoir is 19,500 million m^3, and the dead storage capacity is 5,500 million m^3. The initial storage volume is 14,000 million m^3. Determine the optimal mix of crops to be grown by each of the countries if the ending storage in the reservoir must be 13,000 million m^3. Include a sensitivity analysis and a discussion on the accuracy of the results. Support your analysis with appropriate plots.

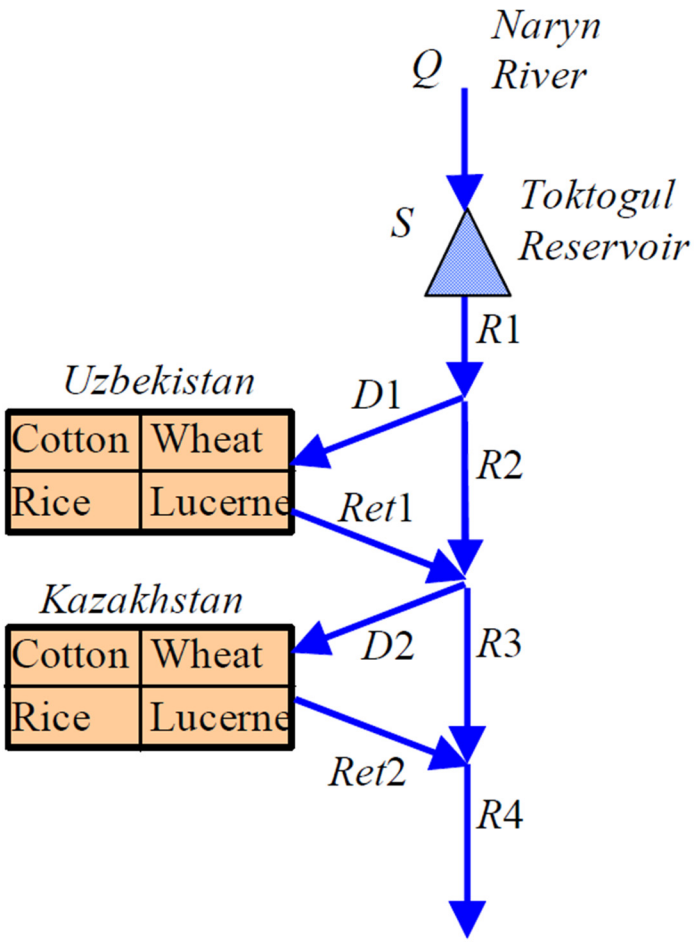

Fig. 1. River Network for Reservoir Operation