The model is constructed with four seasons per year (January-March, April-June, July-September, October-December). Each of the exogenously determined inflow vectors (Q, x, and r) has an assigned individual mean and standard deviation for each season that are calculated from the hydrological record.

The vectors p and p' (and two similar vectors for the two sides not shown in Figure 7.20) are determined by the hydraulic gradient and the transmissibility of the aquifer. The internal flow vectors that connect directly with the groundwater (r', w, u', s, and v) have magnitudes that depend upon: (a) the season, (b) the current depth of the ground water tables, and (c) the inflow variables, r, Q, and x. The mathematical functions relating these factors to the numerical magnitude of a vector is called the "feedback" relation for that vector. They are 3- or 4-parameter functions that were fitted by the analyses of field data from West Pakistan whenever possible. When appropriate data were lacking, use was made of data from agricultural and hydrological experiment stations in other nations with comparable climate and soil.

All vectors discussed so far are treated in the model as stochastic variates fluctuating in a random manner with appropriate dispersion about the mean values as determined by season and groundwater depth. Some variables such as v have only a small random component reflecting the variation in temperature levels and patterns from year to year. Other variables such as r have a large "noise-to-signal" ratio which is made to accord with that found in the historical trace of rainfall. The remaining variables y and z are choice variables that are set by the operating policy, which is itself subject to the optimization process. In general, the tubewell flow and the recirculated flow will be sensitive to the season and current target outputs for irrigation, the depth of the groundwater, current inflows including rain, and the salinity of the pumped water.

The "valves" shown on Figure 7.20 are economic decision points at which cost and benefit functions are introduced. The "valve" on the leakage vector w, for example, represents the cost function for emulsion sealants to achieve various levels of leakage abatement. The magnitude of the leakage w is dependent on: the "setting" of this "valve", which represents the efficacy of the lining, if any; the season of the year; the depth of the groundwater aquifer; and the head or amount of water in the canal distribution system. These factors are appropriately incorporated into the leakage vector feedback function.

It may be noted from Figure 7.20 that in the most general case that can be handled by the single well model, there are 6 "valves" or economic