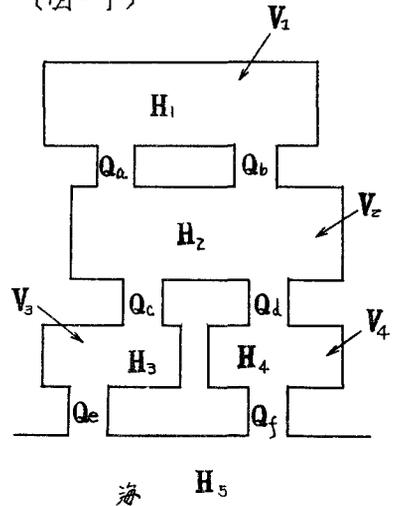


連鎖状湖の水位算定法

株式会社 協成建設コンサルタント 正員 大月達夫

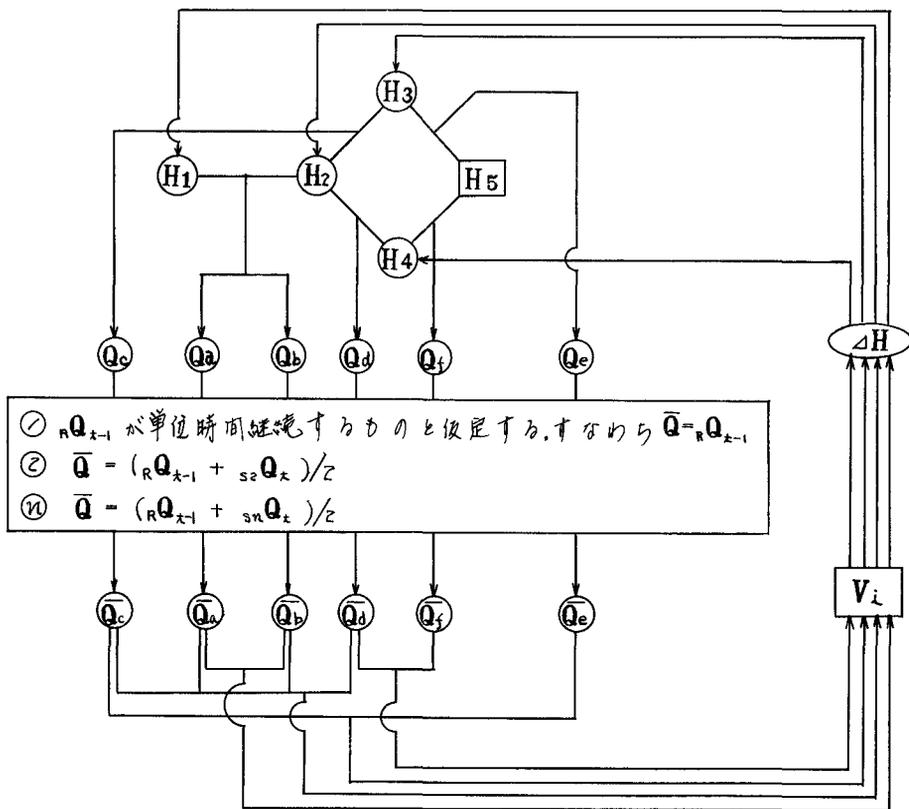
従来、河川における水量の時間変化を追跡する方法としては貯留数法が用いられていながら、多数の連鎖する湖における洪水時の湖水位の時間変化を追跡する方法として筆者は今回次のような方法を試みた。

(図-1)



今、図-1に示すような連鎖湖における毎時刻の湖水位算定を行うものとする。図-1において H_i は湖および海の水位を示し、 Q_i は各湖を結ぶ水路部の流量を、 V_i は河川流出と湖面降水を併せた単位時間内の流入水総量を示す。なお、各湖相互間の移動流水を多すぎない。ここで諸湖への既知流域への降雨量が与えられれば任意の流出量推算法により算定され、また海の潮位も降雨による水位上昇を無視すれば既知なる量である。

水位追跡に当たってはまず降雨による各湖への単位時間当り流入水量を算定する。次に湖相互および湖と海を繋ぐ水路について下流流計算を行っておく。これには下流端水位(始末水位：下流側湖の水位)を2.10 m間隔にとり、各始末水位に対して流量を10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 2860, 2870, 2880, 2890, 2900, 2910, 2920, 2930, 2940, 2950, 2960, 2970, 2980, 2990, 3000, 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 3090, 3100, 3110, 3120, 3130, 3140, 3150, 3160, 3170, 3180, 3190, 3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3290, 3300, 3310, 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上記フローチャートにおいてまず初期時刻($t-1$)の湖水位を与えたと前述の操作により各水路部流量 $_{t-1}Q$ が算出できる。そして、その流量が次時刻(t)まで不変継続するを考慮する。すなわち 単位時間内の平均流量 \bar{Q} は $_{t-1}Q$ に等しい。このにおいて湖への単位時間内流入水流量 V_i と Q_{in} および湖の水位湛水量相関とから単位時間内の湖水位変化量 ΔH が算出できる。こうして求めた時刻(t)での仮定湖水位から各水路流量 $_{t-1}Q$ を算出し $_{t-1}Q$ との相加平均流量 \bar{Q} を計算する。以下同様の操作を繰り返せば真の湖水位が得られる。