V.3.3-SARROUTE   SSARR CHANNEL ROUTING OPERATION

Identifier: SARROUTE

Application: All programs

Description: This Operation routes flows using the Streamflow
Simulation and Reservoir Regulation System (SSARR) method.

A complete description of this Operation is in Section II.4-SARROUTE.

Contact: Northwest River Forecast Center

Allowable Data Time Intervals: 1, 2, 3, 4, 6, 8, 12 and 24 hours

Time Series Used: Time series used in this Operation are as follows:

General Type	Dimn	Units	Use	Required	Data Time Interval	Missing Values Allowed
Begin inflow	L3/T	CMS	I	No	Variable	No
End inflow	L3/T	CMS	I	Yes	Variable	No
Begin outflow	L3/T	CMS	O	No	Variable	No
End outflow	L3/T	CMS	O	Yes	Variable	No

If the begin and end outflow time series are both specified their
units are in CMS. However if the begin outflow time series is not
specified the end outflow time series becomes an average volume
between the time increment.

Input Summary: The card input for this Operation is in free-format
and is as follows:

Card	Field	Format	Contents
1	1	A72	User supplied information
2	1	A8	Begin interval inflow time series identifier
	2	A4	Begin interval inflow data type code: 'SQIB' = both begin and end time interval inflow time series are specified 'NONE' = no begin interval inflow

Card	Field	Format	Contents
			time series identified; only the end interval inflow time series is specified
	3	A8	End interval inflow time series identifier
	4	A4	End interval inflow data type code
	5	A8	Begin interval outflow time series identifier
	6	A4	Begin interval outflow data type code: 'SQIB' = both begin and end time interval outflow time series are specified 'NONE' = no begin interval outflow time series identified; only the end interval outflow time series is specified
	7	A8	End interval outflow time series identifier
	8	A4	End interval outflow data type
3	1	I	Number of routing phases (must be greater than zero)
	2	R	N value of KTS/Q**N computation for time of storage; if N=0 then the time of storage is extracted from the discharge-time of storage table
	3	R	KTS value in hours if N value is non-zero
	4	I	Number of points in the discharge-time of storage; maximum of 20 0 = N value not equal to 0
	5	I	Computation data time interval; must be equal to the inflow and outflow time series data time interval

Card 4+ is needed if the value of N is zero.

Card	Field	Format	Contents
4+	1	R	Discharge (units of CFS)
	2	R	Time of storage (units of HR)

Card 5 is needed if no begin inflow time series is specified.

Card	Field	Format	Contents
5	1	R	Initial begin increment inflow (units of

Card	Field	Format	Contents
			CFS)
6+	1	R	Phase flow (units of CFS); one card per phase flow value; maximum of 99

<u>Sample Input and Information Display</u>: Sample input is shown in
Figure 1. Sample output from the parameter print routine is shown in
Figure 2. There is no execution routine output.

<u>Execution Printer Output</u>: None

<u>Error and Warning Messages</u>: The error and warning messages generated
by this Operation and the corrective action to take when they occur
are as follows:

   A. Messages that can occur during setup:

      1. **ERROR**
   NUMBER OF POINTS IN THE DISCHARGE-TIME OF STORAGE TABLE GREATER
   THAN MAX ALLOWED 50

         Action: Check input sequence on card 3 or decrease number
                    of points in the discharge-time of storage table
                    to less or equal to 50 pairs.

      2. **ERROR**
   NUMBER OF POINTS IN THE DISCHARGE-TIME OF STORAGE TABLE LESS THAN 2

         Action: Check input sequence on card 3 or increase number
                    of points in the discharge-time of storage table
                    to greater than 1 or less or equal to 50.

      3. **ERROR**
   NUMBER OF ROUTING PHASES GREATER THAN MAX ALLOWED 99

         Action: Check input sequence on card 3 or decrease number
                    of routing phases to less than or equal to 99
                    phases.

      4. **ERROR**
   NUMBER OF ROUTING PHASES LESS THAN OR EQUAL TO ZERO

         Action: Check input sequence on card 3 or increase number
                    of routing phases to greater than zero.

B. Messages that can occur during execution: None

<u>Carryover Transfer Rules</u>: The following rules are used during the
carryover transfer process for this Operation:

o Determine whether any of the routing parameters have been
   changed through inspection of the old and new P arrays:

   1. Check whether the routing method has changed; equation or
       table routing. If the old routing method uses an equation
       routing and the new routing method uses table routing or
       vice versa then the routing parameters have changed.

   2. If equation routing used (N value is non-zero) then check
       the KTS values. If the KTS values differ between the old
       and new then the routing parameters have changed.

   3. If table routing used (N value is zero) then check the
       flow versus time of storage tables. If the number of
       points in the table or if any of the points on the tables
       differ then the routing parameters have changed.

   4. If the above 3 tests are passed with no changes then the
       routing parameters have not changed from old to new.

o Transfer the phase flow values in the C arrays:

   1. If the routing parameters have changed then all new phase
       flow values are set to zero.

   2. If the routing parameters have remained unchanged then the
       following is done depending on the number of phases used
       by the old and new routing parameters.

       a. If new and old number of phases are equal then all
           the old phase values are transferred. This is the
           case where the routing parameters between the old
           and new are identical and all routing parameters are
           transferred intact.

       b. If the new number of phases are less than the old
           number of phases then the old phase flow values for
           phase numbers 1 through the new number of phases are
           transferred.

       c. If the new number of phases are greater than the old
           number of phases then all the old phase flow values
           are set equal to the last old phase flow value.

o Transfer the initial begin increment inflow value in the C array
   if the new routing identifies only the end increment inflow time
   series. If the new routing identified both the begin and end
   inflow time series then the initial begin increment inflow value
   is not required to be stored in the C array but will be from the
   begin increment inflow time series.

   1. If the old routing identified only 1 inflow time series
       (the end increment inflow) then the old initial begin
       increment inflow value is transferred:

           CNEW(1) = COLD(1)

2. If the old routing identified both the begin and end
    increment inflow time series then the new initial begin
    increment inflow is set as follows:

    a. If the old routing had more than 1 phase flow value
        then the new initial begin increment inflow is set
        to an interpolated flow value using the old first
        and second phase flow values:

        $$CNEW(1) = COLD(1) + (COLD(1) - COLD(2))$$

    b. If the old routing had just 1 phase then the new
        initial begin increment inflow is set equal to the
        old phase flow value:

        $$CNEW(1) = COLD(1)$$

Punched Card Rules: The following rules are used when punching input
cards for this Operation:

1. The format of punched cards is identical to those described in
    the Input Card Summary of this documentation.

2. No checks are made for the validity of the parametric or
    carryover data during the punching process.

3. Carryover values may be defaulted if desired. In this case all
    carryover values are set to zero.

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                    Figure 1. Sample card input for Operation SARROUTE



SARROUTE    CORWE      INPUT CO
CORWE/QINE ROUTE TO SLMWE
CORWE NONE  CORWE QINE  CORSLMWE SQIB  CORSLMWE SQIE
2  0.2  16.0  0  6
100.
100.
100.
```

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        Figure 2. Sample output from Operation SARROUTE print parameter
                   routine



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 SARROUTE OPERATION     NAME=CORWE        PREVIOUS NAME=INPUT CO

 ********************


        SSARR ROUTING - VERSION    1
        CORWE/QINE ROUTE TO SLMWE




        ------------------------------------------------

                                        ID      CODE
        START INFLOW TIME SERIES       CORWE    NONE
        END   INFLOW TIME SERIES       CORWE    QINE
        START OUTFLOW TIME SERIES      CORSLMWE SQIB
        END   OUTFLOW TIME SERIES      CORSLMWE SQIE
        ------------------------------------------------


        # OF ROUTING PHASES
        ------------------
                2


        TIME OF STORAGE (HOURS) PER PHASE
        ---------------------------------
        TIME OF STORAGE =  16.00 / (DISCHARGE (IN CFS) **   0.20)

        INITIAL START INFLOW TO REACH
        -----------------------------
                  100.0

        CARRYOVER PHASE FLOW VALUES
        CURRENT TO FUTURE PHASE FLOW VALUES
        -----------------------------------
                          FLOW
        PHASE            (CFS)
        -----            -----
          1              100.0
          2              100.0
```