Salvador Díaz Maldonado
Julio, 2023

Tránsito en vasos

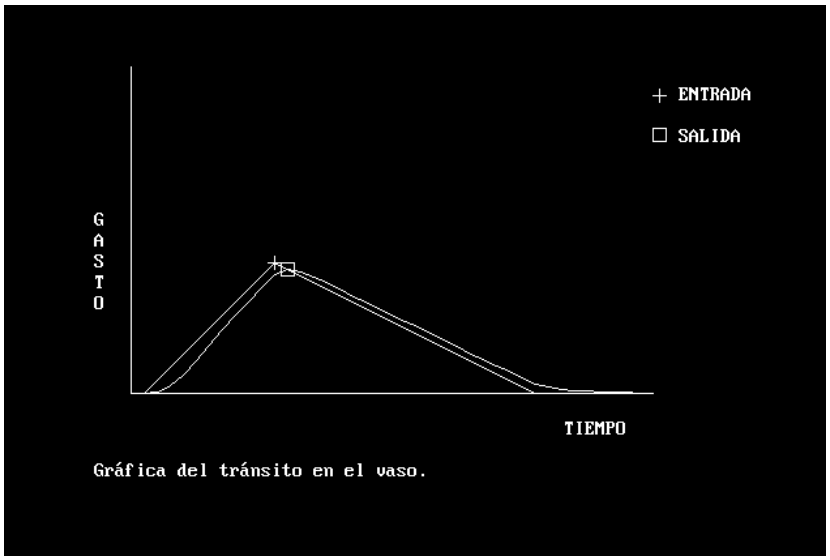
HIDSUP

El archivo Presa1.dat queda igual.

En el archivo Hidro.dat se hace igual a cero la descarga constante, ya que para considerarla en HEC-HMS se requieren datos constructivos de la obra de toma, lo cual no se incluyen en HIDSUP. De esta manera se puede hacer una comparación entre HIDSUP y HEC-HMS.

```
0,50.4,50.4,0,360,.001
15,2,1.5
0
20
40
60
80
100
120
140
160
180
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0
0
0
```

0
0
0
0
0
0
0



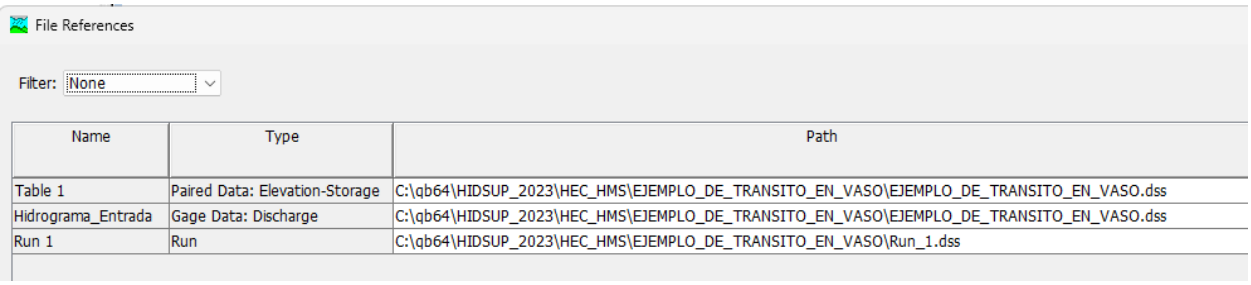
Tránsito en el vaso.

ARCHIVOS DE ENTRADA: Presa1.dat, Hidro.dat

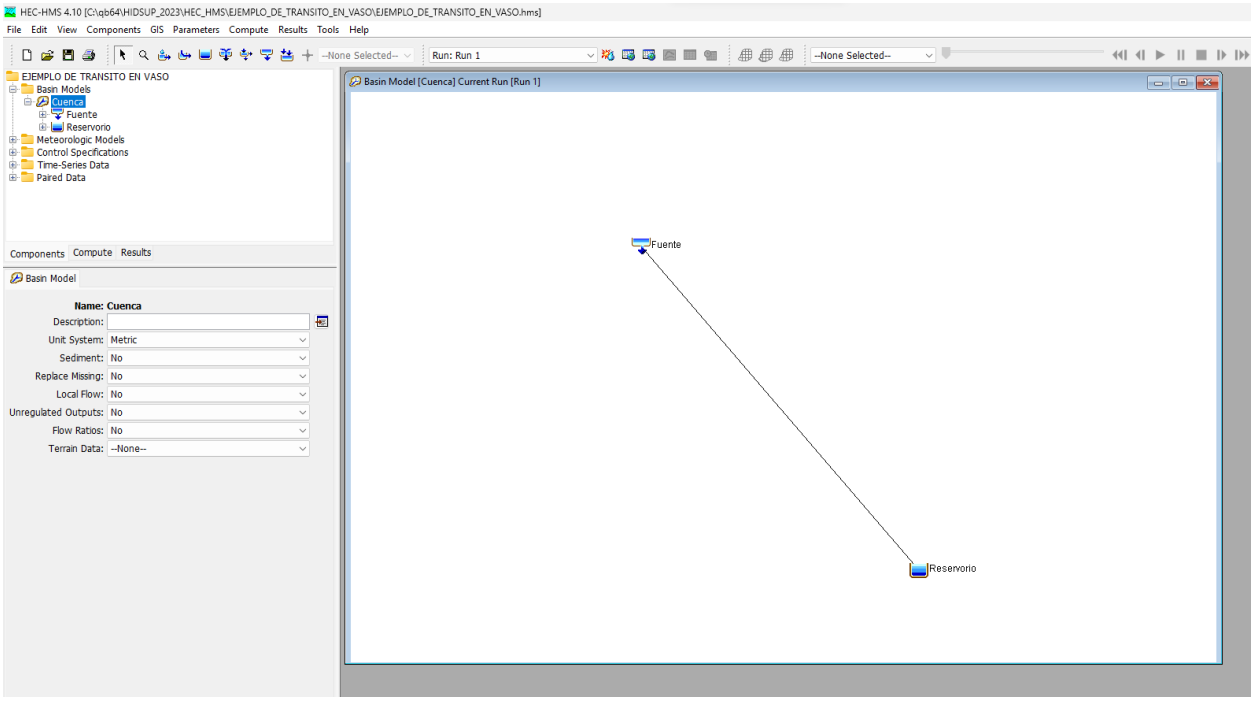
I	ENTRADA(I) m3/s	VOLUMEN(I) 1000m3	ELEV(I) m	SALIDA(I) m3/s
1	0.00	1,020.66	50.40	0.00
2	20.00	1,023.74	50.53	2.99
3	40.00	1,032.06	50.88	11.08
4	60.00	1,042.67	51.32	28.90
5	80.00	1,053.46	51.77	49.92
6	100.00	1,063.91	52.20	74.02
7	120.00	1,072.85	52.58	98.27
8	140.00	1,080.76	52.91	119.70
9	160.00	1,087.49	53.19	140.46
10	180.00	1,093.91	53.45	161.44
11	200.00	1,100.11	53.71	181.72
12	190.00	1,102.76	53.82	190.38
13	180.00	1,101.29	53.76	185.58
14	170.00	1,099.18	53.67	178.68
15	160.00	1,096.45	53.56	169.76
16	150.00	1,093.51	53.43	160.14

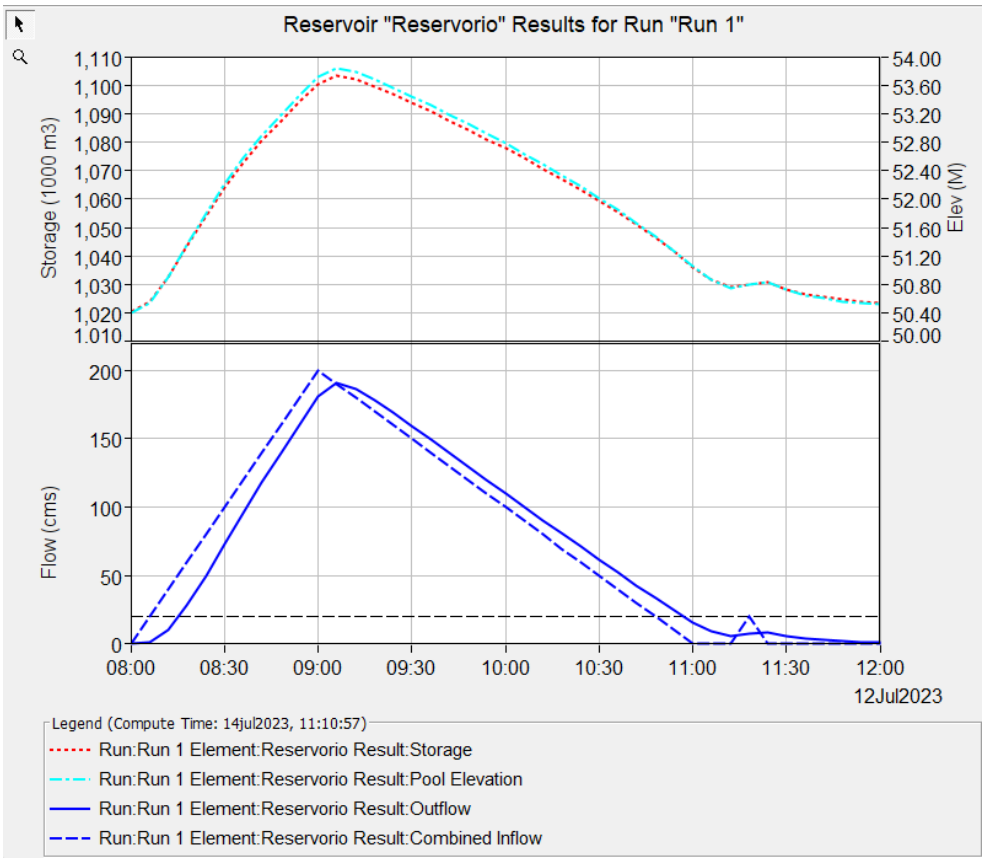
17	140.00	1,089.84	53.28	148.13
18	130.00	1,087.22	53.17	139.57
19	120.00	1,084.28	53.05	129.95
20	110.00	1,080.96	52.92	120.25
21	100.00	1,077.48	52.77	110.81
22	90.00	1,073.87	52.62	101.03
23	80.00	1,070.21	52.47	91.11
24	70.00	1,066.54	52.31	81.14
25	60.00	1,062.85	52.16	71.16
26	50.00	1,058.62	51.98	59.98
27	40.00	1,054.46	51.81	51.86
28	30.00	1,049.77	51.62	42.73
29	20.00	1,044.84	51.41	33.12
30	10.00	1,039.80	51.20	23.30
31	0.00	1,034.82	50.99	13.77
32	0.00	1,030.58	50.82	9.65
33	0.00	1,027.61	50.69	6.76
34	0.00	1,025.53	50.60	4.73
35	0.00	1,024.07	50.54	3.32
36	0.00	1,023.05	50.50	2.32
37	0.00	1,022.36	50.47	1.65
38	0.00	1,021.85	50.45	1.16
39	0.00	1,021.51	50.44	0.82
40	0.00	1,021.26	50.43	0.59
41	0.00	1,021.09	50.42	0.42

HEC-HMS



Name	Type	Path
Table 1	Paired Data: Elevation-Storage	C:\qb64\HIDSUP_2023\HEC_HMS\EJEMPLO_DE_TRANSITO_EN_VASO\EJEMPLO_DE_TRANSITO_EN_VASO.dss
Hidrograma_Entrada	Gage Data: Discharge	C:\qb64\HIDSUP_2023\HEC_HMS\EJEMPLO_DE_TRANSITO_EN_VASO\EJEMPLO_DE_TRANSITO_EN_VASO.dss
Run 1	Run	C:\qb64\HIDSUP_2023\HEC_HMS\EJEMPLO_DE_TRANSITO_EN_VASO\Run_1.dss



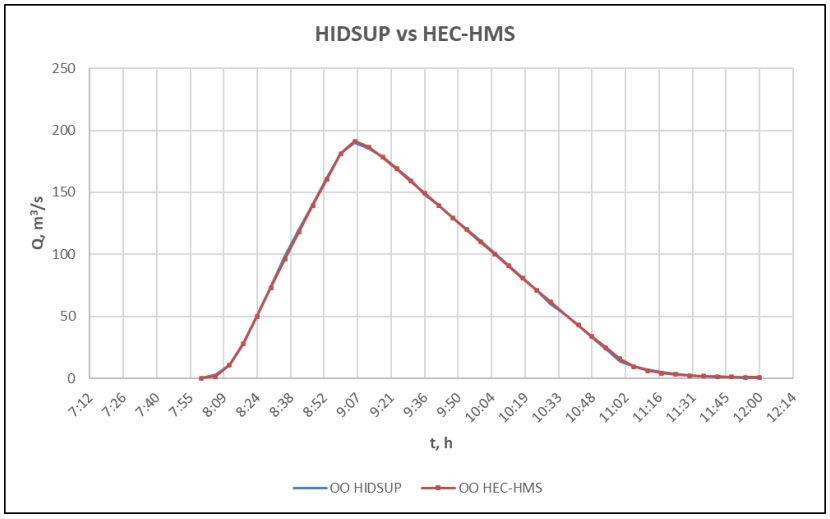

Reservoir "Reservorio" Results for Run "Run 1"
Storage (1000 m3)
Elev (M)
Flow (cms)
1,110
1,100
1,090
1,080
1,070
1,060
1,050
1,040
1,030
1,020
1,010
54.00
53.60
53.20
52.80
52.40
52.00
51.60
51.20
50.80
50.40
50.00
200
150
100
50
0
08:00
08:30
09:00
09:30
10:00
10:30
11:00
11:30
12:00
12Jul2023
Legend (Compute Time: 14jul2023, 11:10:57)
Run:Run 1 Element:Reservorio Result:Storage
Run:Run 1 Element:Reservorio Result:Pool Elevation
Run:Run 1 Element:Reservorio Result:Outflow
Run:Run 1 Element:Reservorio Result:Combined Inflow

Date	Time	Inflow (M3/S)	Storage (1000 M3)	Elevation (M)	Outflow (M3/S)
12jul2023	08:00	0.00	1020.64	50.40	0.00
12jul2023	08:06	20.00	1023.96	50.54	1.55
12jul2023	08:12	40.00	1032.62	50.90	10.64
12jul2023	08:18	60.00	1043.52	51.36	28.03
12jul2023	08:24	80.00	1054.32	51.81	50.02
12jul2023	08:30	100.00	1064.08	52.21	73.18
12jul2023	08:36	120.00	1072.70	52.57	95.93
12jul2023	08:42	140.00	1080.43	52.89	117.97
12jul2023	08:48	160.00	1087.50	53.18	139.39
12jul2023	08:54	180.00	1094.10	53.46	160.42
12jul2023	09:00	200.00	1100.36	53.72	181.21
12jul2023	09:06	190.00	1103.26	53.84	191.15
12jul2023	09:12	180.00	1101.89	53.78	186.45
12jul2023	09:18	170.00	1099.48	53.68	178.24
12jul2023	09:24	160.00	1096.66	53.56	168.83
12jul2023	09:30	150.00	1093.70	53.44	159.10
12jul2023	09:36	140.00	1090.65	53.31	149.29
12jul2023	09:42	130.00	1087.52	53.19	139.47
12jul2023	09:48	120.00	1084.33	53.05	129.66
12jul2023	09:54	110.00	1081.06	52.92	119.85
12jul2023	10:00	100.00	1077.71	52.78	110.06
12jul2023	10:06	90.00	1074.28	52.64	100.31
12jul2023	10:12	80.00	1070.74	52.49	90.58
12jul2023	10:18	70.00	1067.09	52.34	80.90
12jul2023	10:24	60.00	1063.31	52.18	71.26
12jul2023	10:30	50.00	1059.38	52.02	61.68
12jul2023	10:36	40.00	1055.29	51.85	52.20
12jul2023	10:42	30.00	1050.99	51.67	42.80
12jul2023	10:48	20.00	1046.43	51.48	33.55
12jul2023	10:54	10.00	1041.57	51.27	24.54
12jul2023	11:00	0.00	1036.27	51.05	15.86
12jul2023	11:06	0.00	1031.80	50.87	9.57
12jul2023	11:12	0.00	1029.01	50.75	6.21
12jul2023	11:18	20.00	1030.13	50.80	7.50
12jul2023	11:24	0.00	1030.86	50.83	8.39
12jul2023	11:30	0.00	1028.39	50.72	5.54
12jul2023	11:36	0.00	1026.72	50.65	3.85
12jul2023	11:42	0.00	1025.54	50.61	2.78
12jul2023	11:48	0.00	1024.67	50.57	2.08
12jul2023	11:54	0.00	1024.01	50.54	1.59
12jul2023	12:00	0.00	1023.51	50.52	1.25

Salvador Díaz Maldonado
Julio, 2023

HIDSUP vs HEC-HMS

HIDSUP							HEC-HMS					
i	t s	Hora	ENTRADA(i) m3/s	VOLUMEN(i) 1000 m^3	ELEV(i) m	SALIDA m^3/s	Date	Time	Inflow (M3/S)	Storage (1000 M3)	Elevation (M)	Outflow (M3/S)
1	0	8:00	0	1,020.66	50.4	0.00	12-Jul-23	8:00	0.00	1020.64	50.40	0.00
2	360	8:06	20	1,023.74	50.53	2.99	12-Jul-23	8:06	20.00	1023.96	50.54	1.55
3	720	8:12	40	1,032.06	50.88	11.08	12-Jul-23	8:12	40.00	1032.62	50.90	10.64
4	1080	8:18	60	1,042.67	51.32	28.9	12-Jul-23	8:18	60.00	1043.52	51.36	28.03
5	1440	8:24	80	1,053.46	51.77	49.92	12-Jul-23	8:24	80.00	1054.32	51.81	50.02
6	1800	8:30	100	1,063.91	52.2	74.02	12-Jul-23	8:30	100.00	1064.08	52.21	73.18
7	2160	8:36	120	1,072.85	52.58	98.27	12-Jul-23	8:36	120.00	1072.70	52.57	95.93
8	2520	8:42	140	1,080.76	52.91	119.7	12-Jul-23	8:42	140.00	1080.43	52.89	117.97
9	2880	8:48	160	1,087.49	53.19	140.46	12-Jul-23	8:48	160.00	1087.50	53.18	139.39
10	3240	8:54	180	1,093.91	53.45	161.44	12-Jul-23	8:54	180.00	1094.10	53.46	160.42
11	3600	9:00	200	1,100.11	53.71	181.72	12-Jul-23	9:00	200.00	1100.36	53.72	181.21
12	3960	9:06	190	1,102.76	53.82	190.38	12-Jul-23	9:06	190.00	1103.26	53.84	191.15
13	4320	9:12	180	1,101.29	53.76	185.58	12-Jul-23	9:12	180.00	1101.89	53.78	186.45
14	4680	9:18	170	1,099.18	53.67	178.68	12-Jul-23	9:18	170.00	1099.48	53.68	178.24
15	5040	9:24	160	1,096.45	53.56	169.76	12-Jul-23	9:24	160.00	1096.66	53.56	168.83
16	5400	9:30	150	1,093.51	53.43	160.14	12-Jul-23	9:30	150.00	1093.70	53.44	159.10
17	5760	9:36	140	1,089.84	53.28	148.13	12-Jul-23	9:36	140.00	1090.65	53.31	149.29
18	6120	9:42	130	1,087.22	53.17	139.57	12-Jul-23	9:42	130.00	1087.52	53.19	139.47
19	6480	9:48	120	1,084.28	53.05	129.95	12-Jul-23	9:48	120.00	1084.33	53.05	129.66
20	6840	9:54	110	1,080.96	52.92	120.25	12-Jul-23	9:54	110.00	1081.06	52.92	119.85
21	7200	10:00	100	1,077.48	52.77	110.81	12-Jul-23	10:00	100.00	1077.71	52.78	110.06
22	7560	10:06	90	1,073.87	52.62	101.03	12-Jul-23	10:06	90.00	1074.28	52.64	100.31
23	7920	10:12	80	1,070.21	52.47	91.11	12-Jul-23	10:12	80.00	1070.74	52.49	90.58
24	8280	10:18	70	1,066.54	52.31	81.14	12-Jul-23	10:18	70.00	1067.09	52.34	80.90
25	8640	10:24	60	1,062.85	52.16	71.16	12-Jul-23	10:24	60.00	1063.31	52.18	71.26
26	9000	10:30	50	1,058.62	51.98	59.98	12-Jul-23	10:30	50.00	1059.38	52.02	61.68
27	9360	10:36	40	1,054.46	51.81	51.86	12-Jul-23	10:36	40.00	1055.29	51.85	52.20
28	9720	10:42	30	1,049.77	51.62	42.73	12-Jul-23	10:42	30.00	1050.99	51.67	42.80
29	10080	10:48	20	1,044.84	51.41	33.12	12-Jul-23	10:48	20.00	1046.43	51.48	33.55
30	10440	10:54	10	1,039.80	51.2	23.3	12-Jul-23	10:54	10.00	1041.57	51.27	24.54
31	10800	11:00	0	1,034.82	50.99	13.77	12-Jul-23	11:00	0.00	1036.27	51.05	15.86
32	11160	11:06	0	1,030.58	50.82	9.65	12-Jul-23	11:06	0.00	1031.80	50.87	9.57
33	11520	11:12	0	1,027.61	50.69	6.76	12-Jul-23	11:12	0.00	1029.01	50.75	6.21
34	11880	11:18	0	1,025.53	50.6	4.73	12-Jul-23	11:18	0.00	1027.15	50.67	4.26
35	12240	11:24	0	1,024.07	50.54	3.32	12-Jul-23	11:24	0.00	1025.84	50.62	3.05
36	12600	11:30	0	1,023.05	50.5	2.32	12-Jul-23	11:30	0.00	1024.90	50.58	2.25
37	12960	11:36	0	1,022.36	50.47	1.65	12-Jul-23	11:36	0.00	1024.19	50.55	1.71
38	13320	11:42	0	1,021.85	50.45	1.16	12-Jul-23	11:42	0.00	1023.64	50.53	1.33
39	13680	11:48	0	1,021.51	50.44	0.82	12-Jul-23	11:48	0.00	1023.21	50.51	1.06
40	14040	11:54	0	1,021.26	50.43	0.59	12-Jul-23	11:54	0.00	1022.87	50.49	0.85
40	14400	12:00	0	1,021.09	50.42	0.42	12-Jul-23	12:00	0.00	1022.59	50.48	0.70



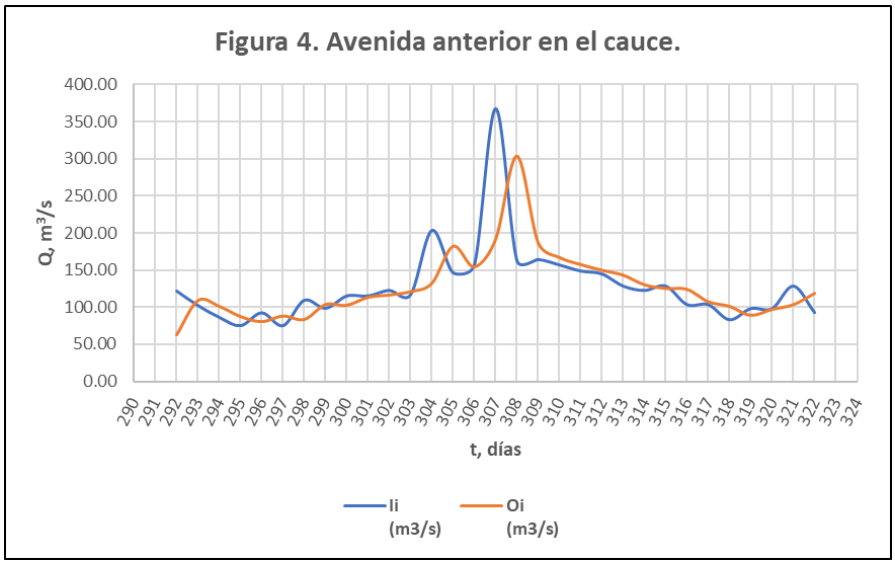
Tránsito en cauces

HIDSUP

Suponga que se tienen los siguientes datos de una avenida anterior, medidos con intervalos de 1 día:

t días	I m^3/s	O m^3/s
0	59	42
1	93	70
2	129	76
3	205	142
4	210	183
5	234	185
6	325	213
7	554	293
8	627	397
9	526	487
10	432	533
11	252	481
12	203	371
13	158	252
14	130	196
15	105	161
16	90	143
17	80	112
18	68	95
19	59	83
20	59	75

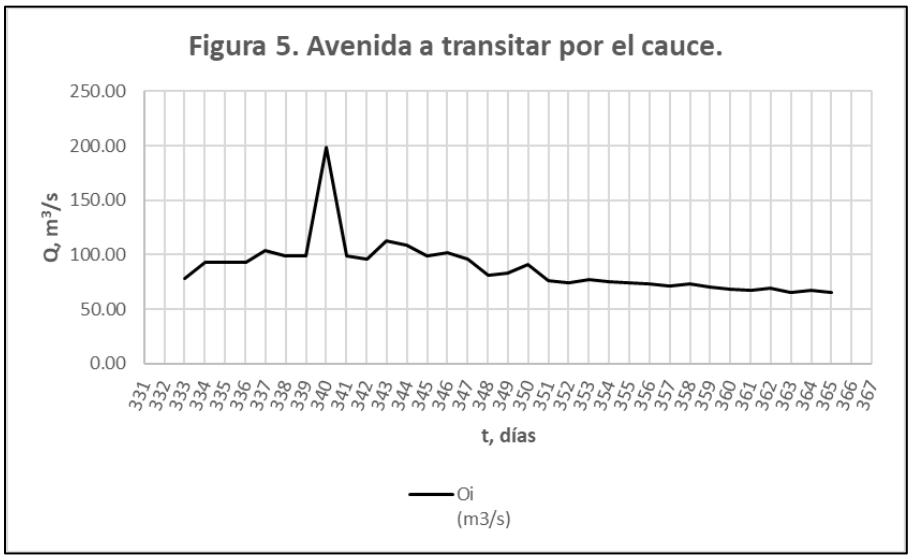
Ver Figura 4.



Y se quiere transitar la siguiente avenida, también con gastos medidos con intervalos de 1 día (figura 5):

t días	I m³/s
0	40.0
1	80.0
2	130.0
3	240.0
4	350.0
5	610.0
6	1,050.0
7	980.0
8	760.0
9	610.0
10	525.0
11	940.0
12	1,520.0

13	1,210.0
14	1,180.0
15	1,005.0
16	930.0
17	810.0
18	760.0
19	690.0
20	660.0
21	600.0
22	500.0
23	400.0
24	310.0
25	250.0
26	190.0
27	170.0
28	140.0



Entonces, para poder correr la opción 3 del programa **HIDSUP** se debe crear el siguiente archivo de datos, que para este caso se le dio el nombre de "Cauce.dat":

```
1,21
59,42
93,70
129,76
205,142
.
.
.
59,83
59,75
29
40
80
130
240
.
.
.
170
140
```

Posteriormente se siguen los pasos dados para la ejecución.

Los resultados arrojados por **HIDSUP** se muestran en las figuras 6 y 7 y tabla 4. En caso de que se deseen gráficas de más calidad, graficar con algún otro paquete como Excel.

Figura 6

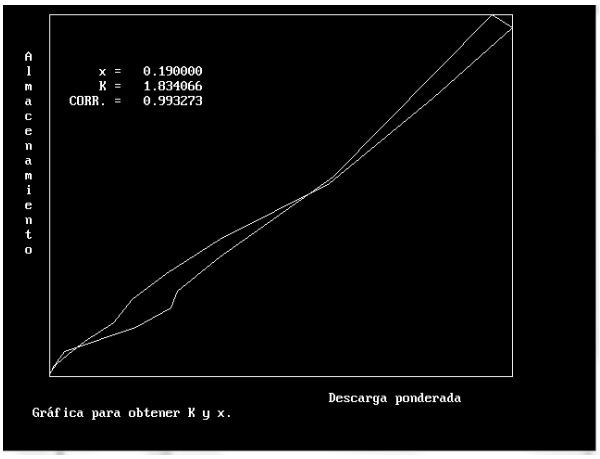


Figura 7.

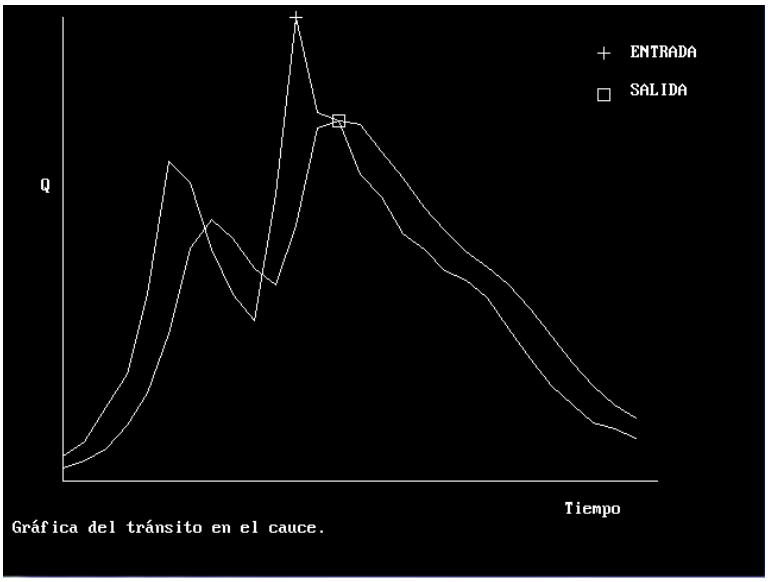


TABLA 4. RESULTADOS NUMERICOS DEL TRANSITO EN EL CAUCE.

ARCHIVO: cauce.dat

EL MEJOR AJUSTE SE OBTIENE CON x = .19 Y K = 1.817258

C1 = .4286451 , C2 = .0784598 , C3 = .4928951

POR LO TANTO:

Oi+1 = .4286451 Ii + .0784598 Ii+1 + .4928951 Oi

TABLA 4. RESULTADOS NUMERICOS DEL TRANSITO EN EL CAUCE.

I	I(I)	O(I)
0	40.00	40.00
1	80.00	43.14
2	130.00	65.75
3	240.00	106.96
4	350.00	183.06
5	610.00	288.11
6	1,050.00	485.87
7	980.00	766.45
8	760.00	857.48

9	610.00	796.28
10	525.00	695.15
11	940.00	641.43
12	1,520.00	838.34
13	1,210.00	1,159.69
14	1,180.00	1,182.85
15	1,005.00	1,167.67
16	930.00	1,079.30
17	810.00	994.17
18	760.00	896.85
19	690.00	821.96
20	660.00	752.69
21	600.00	700.98
22	500.00	641.93
23	400.00	562.11
24	310.00	472.84
25	250.00	385.56
26	190.00	312.11
27	170.00	248.62
28	140.00	206.40

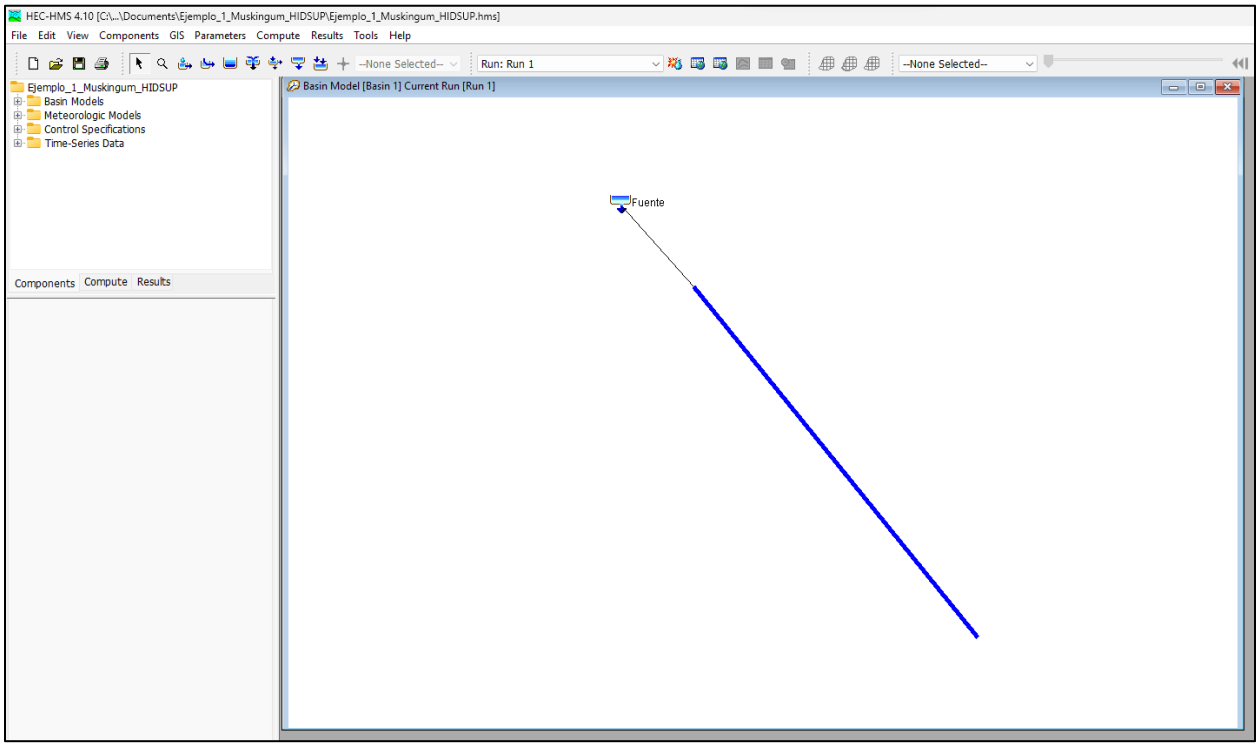
HEC-HMS

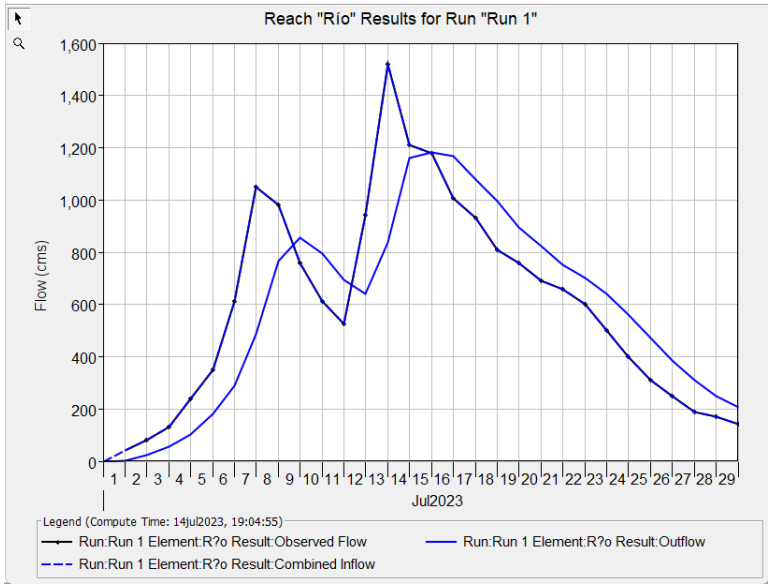
Para aplicar HEC-HMS se usarán los valores estimados por **HIDSUP** de x y de K.

x = 0.19 y K = 1.817258 día*24 h/1día = 43.6142 h

HEC-HMS solicita el valor de K en horas.

"C:\qb64\HIDSUP_2023\HEC_HMS\Muskingum_1_Mi_manual"


HEC-HMS 4.10 [C:\...\Documents\Ejemplo_1_Muskingum_HIDSUP\Ejemplo_1_Muskingum_HIDSUP.hms]
File Edit View Components GIS Parameters Compute Results Tools Help
--None Selected--
Run: Run 1
--None Selected--
Ejemplo_1_Muskingum_HIDSUP
Basin Models
Meteorologic Models
Control Specifications
Time-Series Data
Components Compute Results
Basin Model [Basin 1] Current Run [Run 1]
Fuente


Reach "Río" Results for Run "Run 1"
Flow (cms)
1,600
1,400
1,200
1,000
800
600
400
200
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
Jul2023
Legend (Compute Time: 14jul2023, 19:04:55)
Run:Run 1 Element:R?o Result:Observed Flow
Run:Run 1 Element:R?o Result:Outflow
Run:Run 1 Element:R?o Result:Combined Inflow

Time-Series Results for Reach "Río"

Project: Ejemplo_1_Muskingum_HIDSUP Simulation Run: Run 1
Reach: Río

Start of Run: 01jul2023, 00:00 Basin Model: Basin 1
End of Run: 30jul2023, 00:00 Meteorologic Model: Met 1
Compute Time: 14jul2023, 19:04:55 Control Specifications: Control 1

Date	Time	Inflow (M3/S)	Outflow (M3/S)	Obs Flow (M3/S)
01jul2023	00:00	0.00	0.00	
02jul2023	00:00	40.00	3.14	40.00
03jul2023	00:00	80.00	24.97	80.00
04jul2023	00:00	130.00	56.80	130.00
05jul2023	00:00	240.00	102.55	240.00
06jul2023	00:00	350.00	180.88	350.00
07jul2023	00:00	610.00	287.04	610.00
08jul2023	00:00	1050.00	485.34	1050.00
09jul2023	00:00	980.00	766.19	980.00
10jul2023	00:00	760.00	857.35	760.00
11jul2023	00:00	610.00	796.22	610.00
12jul2023	00:00	525.00	695.12	525.00
13jul2023	00:00	940.00	641.41	940.00
14jul2023	00:00	1520.00	838.33	1520.00
15jul2023	00:00	1210.00	1159.69	1210.00
16jul2023	00:00	1180.00	1182.85	1180.00
17jul2023	00:00	1005.00	1167.67	1005.00
18jul2023	00:00	930.00	1079.30	930.00
19jul2023	00:00	810.00	994.17	810.00
20jul2023	00:00	760.00	896.85	760.00
21jul2023	00:00	690.00	821.96	690.00
22jul2023	00:00	660.00	752.69	660.00
23jul2023	00:00	600.00	700.98	600.00
24jul2023	00:00	500.00	641.93	500.00
25jul2023	00:00	400.00	562.11	400.00
26jul2023	00:00	310.00	472.84	310.00
27jul2023	00:00	250.00	385.56	250.00
28jul2023	00:00	190.00	312.11	190.00
29jul2023	00:00	170.00	248.62	170.00
30jul2023	00:00	140.00	206.40	140.00

HIDSUP vs HEC-HMS

i	I_i m³/s	O_i m3/s
0	40	40.00
1	80	43.14
2	130	65.75
3	240	106.96
4	350	183.06
5	610	288.11
6	1,050	485.87
7	980	766.45
8	760	857.48
9	610	796.28
10	525	695.15
11	940	641.43
12	1,520	838.34
13	1,210	1,159.69
14	1,180	1,182.85
15	1,005	1,167.67
16	930	1,079.30
17	810	994.17
18	760	896.85
19	690	821.96
20	660	752.69
21	600	700.98
22	500	641.93
23	400	562.11
24	310	472.84
25	250	385.56
26	190	312.11
27	170	248.62
28	140	206.40

Date	Time	Inflow (M3/S)	Outflow (M3/S)	Obs Flow (M3/S)
1-Jul-23	0:00	0	0	
2-Jul-23	0:00	40	3.14	40
3-Jul-23	0:00	80	24.97	80
4-Jul-23	0:00	130	56.80	130
5-Jul-23	0:00	240	102.55	240
6-Jul-23	0:00	350	180.88	350
7-Jul-23	0:00	610	287.04	610
8-Jul-23	0:00	1,050	485.34	1,050
9-Jul-23	0:00	980	766.19	980
10-Jul-23	0:00	760	857.35	760
11-Jul-23	0:00	610	796.22	610
12-Jul-23	0:00	525	695.12	525
13-Jul-23	0:00	940	641.41	940
14-Jul-23	0:00	1,520	838.33	1,520
15-Jul-23	0:00	1,210	1,159.69	1,210
16-Jul-23	0:00	1,180	1,182.85	1,180
17-Jul-23	0:00	1,005	1,167.67	1,005
18-Jul-23	0:00	930	1,079.30	930
19-Jul-23	0:00	810	994.17	810
20-Jul-23	0:00	760	896.85	760
21-Jul-23	0:00	690	821.96	690
22-Jul-23	0:00	660	752.69	660
23-Jul-23	0:00	600	700.98	600
24-Jul-23	0:00	500	641.93	500
25-Jul-23	0:00	400	562.11	400
26-Jul-23	0:00	310	472.84	310
27-Jul-23	0:00	250	385.56	250
28-Jul-23	0:00	190	312.11	190
29-Jul-23	0:00	170	248.62	170
30-Jul-23	0:00	140	206.40	140