

UNIVERSITY OF ILLINOIS
DIGITAL COMPUTER

AUXILIARY LIBRARY ROUTINE M 31 - 297

TITLE: Drum Routine for Linear Programming by the Simplex
Method-Modified for Variable Resource b_i (SADOI or DOI)
TYPE: Complete Floating Point Program
DESCRIPTION: All directions are the same as for Williams Memory Routine
M 30 - 296 except:
The resource to be varied may be in any row and the parameter
tape is prepared as follows:

005+
00F 00jF
00F 00iF
00F 00tF
00F 00rF
24999N

where

j = number of activities (excluding slack vectors and P_0)
 i = number of restraints
 t = frequency of intermediate print-out
 r = designation of row for the resources to be varied
(This is not necessarily the first row).

CAPACITY: Williams Memory Storage $2(j + 1) + 4i \leq 667$
Drum Storage $(j + 1)(i + 1) \leq 10,240$

TIMING: The time required per iteration is comparable to that re-
quired for the routine M 29 - 295, but there will be more
iterations than if all the coefficients were constants.

EXAMPLE: The problem mentioned in the Williams Memory Routine M 30 - 296
would be put in with the same coefficient tape but the
parameter tape would be:

005+
00F 005F (5 structural vectors)
00F 005F (5 basis vectors)
00F 001F (print each iteration)
00F 001F (b_i is in first row)
24999N

The output will be the same as that shown in the other write-up.

DATE	<u>May 25, 1960</u>
CODED BY	<u>L. Isaacson</u>
WRITE-UP BY	<u>R. W. Hackler</u>
APPROVED BY	<u>J. Snyder</u>

LOCATION	ORDER	NOTES	PAGE 1	M 31
	DOI Routine X 1			
	003K			
0	00 F			
	00 3F			
1	00 F			
	00 21F			
	0010K			
0	00 F			
	00 357F			
	0014K			
0	00 F			
	00 189F			
1	00 F			
	00 2560F			
2	00 F			
	00 317F			
	0021K			
0	00 59F			
	L0 166L			
1	L0 124L			
	40 2L			
2	50 F			
	S5 20F			
3	40 2F			
	32 150L			
4	46 6L			
	10 12F			
5	L4 125L			
	46 9L			
6	L5 F			
	10 1F			
7	40 F			
	10 6F			
8	01 7F			
	40 1F			

LOCATION	ORDER	NOTES
9	26 F	
	40 F	
10	L5 1S3	
	L0 1F	
11	50 F	
	32 15L	
12	40 2F	
	S5 F	
13	50 S3	
	40 S3	
14	L5 1F	
	40 1S3	
15	L1 2F	
	L4 125L	
16	42 17L	
	L0 126L	
17	36 29L	
	7J F	
18	L4 S3	
	40 S3	
19	LL S3	
	36 27L	
20	50 S3	
	7J 32L	
21	40 S3	
	L5 43L	
22	L4 1S3	
	40 1S3	
23	26 27L	
	50 S3	
24	75 127L	
	00 4F	
25	40 S3	
	L1 43L	
26	L4 1S3	
	40 1S3	

LOCATION	ORDER	NOTES PAGE 3 M 31
27	L3 S3 36 68L	
28	L4 42L 32 23L	
29	L5 2L 36 1L	
30	L4 128L 22 1L	
31	7L 4095F LL 4095F	
32	00 F 00 1000 0000 0000 J	
33	00 F 00 1000 0000 000 J	
34	00 F 00 1000 0000 00 J	
35	00 F 00 1000 0000 0 J	
36	00 F 00 1000 0000 J	
37	00 F 00 1000 000 J	
38	00 F 00 1000 00 J	
39	00 F 00 1000 0 J	
40	00 F 00 1000 J	
41	00 F 00 64F	
42	00 F 00 4999 9999 998 J	
43	00 F 00 1F	
44	LL F 22 9L	

LOCATION	ORDER	NOTES
45	L1 F	
	26 67L	
46	L5 131L	
	26 133L	
47	L5 131L	
	22 133L	
48	J0 1021F	
	26 10L	
49	L5 F	
	26 67L	
50	L1 1F	
	26 63L	
51	L0 41L	
	26 60L	
52	49 1F	
	22 77L	
53	L5 6L	
	22 97L	
54	41 1F	
	26 138L	
55	L5 6L	
	26 69L	
56	L7 S3	
	26 76L	
57	L5 2F	
	22 5L	
58	92 131F	
	26 95L	
59	L5 6L	
	22 149L	
60	L4 1S3	
	40 1S3	
61	50 F	
	7J S3	
62	00 1F	
	22 18L	

LOCATION	ORDER	NOTES PAGE 5 M 31
63	L4 130L	
	L4 1S3	
64	40 1S3	
	50 42L	
65	75 S3	
	66 F	
66	S5 31L	
	22 18L	
67	40 S3	
	L5 1F	
68	40 1S3	
	26 29L	
69	46 75L	
	L5 1S3	
70	32 71L	
	41 S3	
71	41 1S3	
	L0 167L	
72	34 72L	
	L5 S3	
73	10 6F	
	50 1F	
74	00 7F	
	L4 1S3	
75	50 F	
	26 29L	
76	40 S3	
	L3 F	
77	22 9L	
	81 4F	
78	00 39F	
	36 80L	
79	L1 1F	
	40 1F	
80	27 84L	
	50 1F	

LOCATION	ORDER	NOTES
81	7J 32L 40 1F	
82	50 1F 75 2F	
83	00 39F L4 S3	
84	40 S3 81 4F	
85	40 2F L0 129L	
86	36 87L 22 80L	
87	81 4F 40 F	
88	81 4F 50 F	
89	74 129L L1 2F	
90	L4 129L 36 92L	
91	S1 31L 22 92L	
92	S5 F L4 41L	
93	40 1S3 26 19L	
94	L1 F 50 4F	
95	L5 2F 10 20F	
96	42 94L 47 94L	
97	26 29L L4 91L	

LOCATION	ORDER	NOTES	PAGE 7	M 31
98	46 105L L5 94L			
99	L0 79L 36 101L			
100	92 131F 22 122L			
101	46 94L L5 S3			
102	40 F 36 104L			
103	92 708F 22 104L			
104	92 644F 50 101L			
105	7J F L6 F			
106	L6 F 32 110L			
107	L5 43L L4 1S3			
108	40 1S3 L5 42L			
109	40 S3 40 F			
110	22 104L 10 39F			
111	75 129L 00 36F			
112	82 4F 10 40F			
113	L5 6L L0 49L			
114	46 6L L0 62L			
115	36 111L 92 961F			

LOCATION	ORDER	NOTES PAGE 8 M 31
116	L1 48L 40 48L	
117	32 118L 92 961F	
118	26 29L 46 6L	
119	L5 1S3 L0 41L	
120	40 F 50 F	
121	75 33L 00 38F	
122	26 102L 92 513F	
123	00 24F 26 101L	
124	5S F S5 F	
125	00 172L 00 31L	
126	00 172L 00 42L	
127	50 F 00 F	
128	5S 1F S5 F	
129	00 F 00 10F	
130	00 F 00 65F	
131	50 F S5 20F	
132	00 1F 00 1F	
133	L0 124L 40 1F	

LOCATION	ORDER	NOTES
134	L5 2F 46 1F	
135	32 143L L5 S3	
136	36 137L 26 29L	
137	L5 1F 22 1L	
138	L5 2F 36 146L	
139	46 1F 50 1F	
140	75 33L 00 18F	
141	40 S3 L5 130L	
142	L4 43L 40 1S3	
143	26 19L L5 157L	
144	L4 132L 40 157L	
145	00 28F 26 136L	
146	10 20F 42 1F	
147	L1 1F 50 158L	
148	L4 157L 40 157L	
149	26 29L 46 157L	
150	26 29L 50 2F	

LOCATION	ORDER	NOTES
151	01 3F L4 147L	
152	42 143L 42 155L	
153	42 148L 42 149L	
154	42 144L J0 166L	
155	11 3F L5 157L	
156	S4 F 26 4L	
157	80 F 00 2048F	
158	80 F 00 F	
159	80 F 00 F	
160	80 F 00 F	
161	80 F 00 F	
162	80 F 00 F	
163	80 F 00 F	
164	80 F 00 F	
165	80 F 00 F	
166	LL 4094F 4K 4076F	
167	00 F 00 128F 00 121K	

LOCATION	ORDER	NOTES
0	92 963F 22 122S4 24999N 001000K	
0	81 8F 26 1005F 00189K	
0	F5 5F L4 6F	
1	40 9F L5 10F	
2	L4 6F 40 13F	
3	L4 6F 40 19F	
4	F4 5F 40 20F	
5	L4 6F 40 11F	
6	F4 5F 40 12F	
7	L4 6F 40 17F	
8	L5 10F L4 8F	
9	L0 11L 40 18F	
10	50 12L 26 999F	
11	00 F 00 1F	
12	00 F 00 L	
13	00 F 26 L	

LOCATION	ORDER	NOTES PAGE 12 M 31
	261N	
14	L1 6F	
	L0 5F	
15	40 8L	
	41 S13	
16	F5 S13	
	40 1S13	
17	F5 8L	
	40 8L	
18	36 9L	
	L5 2L	
19	L4 7L	
	40 2L	
20	26 2L	
	00 F	
21	00 1F	
	00 1F	
22	00 F	
	00 F	
23	50 10L	
	26 999F	
24	00 F	
	00 L	
25	00 F	
	26 L	
	261N	
26	41 9F	
	50 L	
27	26 S040	
	K1 S05	
28	1K S0	
	68 8F	
29	1S S0	
	K1 22L	
30	8J 56L	
	03 2L	

LOCATION	ORDER	NOTES PAGE 13 M 31
31	2K SO 98 8F	
32	2S SO S2 25L	
33	8K F 8S 11F	
34	OK 1S05 8J 61L	
35	1K S06 8K F	
36	8S 10F 15 SOK	
37	17 SON 84 10F	
38	8S 10F 12 10L	
39	00 SOS 0S S11	
40	82 19L 81 S12	
41	82 19L 05 S11	
42	86 S12 8S 16F	
43	80 11F 82 19L	
44	85 16F 8S 11F	
45	8J 53L 8J 66L	
46	02 8L 85 11F	
47	82 65L 8J 68L	
48	3K S06 OK S08	

LOCATION	ORDER	NOTES PAGE 14 M 31
49	02 24L	
	OK 1023F	
50	03 31L	
	85 125L	
51	3N SOJ	
	83 31L	
52	31 SOJ	
	83 31L	
53	35 SOK	
	36 SOJ	
54	8S 10F	
	80 124L	
55	83 31L	
	85 10F	
56	8S 124L	
	8J 92L	
57	8J 66L	
	33 23L	
58	85 124L	
	80 123L	
59	82 81L	
	8J 96L	
60	4K S06	
	4S SOK	
61	42 34L	
	8K 1F	
62	8S F	
	8J 56L	
63	8J 104L	
	5K 1S05	
64	8J 61L	
	6K S06	
65	85 F	
	86 F	

LOCATION	ORDER	NOTES	PAGE 15	M 31
66	8S 17F			
	61 SOJ			
67	87 17F			
	64 SOK			
68	6S SOK			
	62 40L			
69	85 17F			
	8S F			
70	8J 56L			
	53 38L			
71	8J 106L			
	2K S06			
72	8F 1F			
	8J 61L			
73	8J 76L			
	25 SOK			
74	89 9F			
	23 47L			
75	2K 1S05			
	8F 1F			
76	8J 80L			
	8J 76L			
77	25 S1			
	18 99F			
78	22 50L			
	8J 82L			
79	L3 9F			
	36 91L			
80	L5 9F			
	40 18F			
81	26 29S04			
	00 S13			
82	J0 SOK			
	50 56L			
83	26 S10			
	00 SOL			

LOCATION	ORDER	NOTES
84	00 S06	
	L5 57L	
85	F4 6F	
	40 57L	
86	26 29S04	
	00 S0K	
87	50 S0K	
	50 61L	
88	26 S10	
	00 SOL	
89	00 S06	
	L5 62L	
90	F4 6F	
	40 62L	
91	26 29S04	
	8J 102L	
92	F5 9F	
	40 9F	
93	26 29S04	
	00 SOS	
94	L3 7F	
	36 83L	
95	F5 8F	
	40 8F	
96	36 71L	
	26 83L	
97	L5 2S0	
	44 09F	
98	L1 7F	
	40 8F	
99	L5 127L	
	40 62L	
100	41 S03	
	50 74L	
101	26 S04	
	82 45L	

LOCATION	ORDER	NOTES
102	92 131F L5 S14	
103	00 28F 82 12F	
104	92 963F F5 76L	
105	42 76L 26 29S04	
106	L5 55L 42 76L	
107	26 29S04 8J 94L	
108	L5 9F 40 2S04	
109	41 9F 50 126L	
110	75 18F L5 127L	
111	S4 F 26 86L	
112	40 88L 40 57L	
113	50 S0J 50 87L	
114	26 S10 00 F	
115	00 S06 L5 127L	
116	40 62L 26 61L	
117	40 11F 26 29S04	
118	L5 9F 40 16F	
119	26 29S04 00 S14	

LOCATION	ORDER	NOTES	PAGE 18	M 31
120	FF F 00 F			
121	OF F 00 F			
122	L5 60L L4 16F			
123	42 43L 00 20F			
124	46 36L 46 39L			
125	L5 13F L4 16F			
126	42 39L 41 S03			
127	41 1S03 26 29S04			
128	L5 103L 42 52L			
129	26 73L 00 95L			
130	L5 127L 40 57L			
131	40 62L 26 29S04			
132	L5 127L 40 62L			
133	L5 123L 40 124L			
134	L5 67L L4 18F			
135	42 112L 42 113L			
136	L5 12F L4 16F			
137	42 114L 00 20F			

LOCATION	ORDER	NOTES
138	46 113L 50 F	
139	L5 F 40 F	
140	S5 F 40 F	
141	L1 L 40 L	
142	32 119L L5 19F	
143	L4 18F 42 112L	
144	42 113L L5 20F	
145	22 110L 41 9F	
146	L5 93L 42 76L	
147	41 S03 50 121L	
148	26 S0 48 37L	
149	40 F 00 127F	
150	40 F 00 127F	
151	0N 3274F NN 3253F	
152	00 F 00 1S06	
153	26 S10 00 SOL 00 317K	
0	K5 F 42 9L	
1	42 33L F4 21L	
2	42 3L 42 31L	

LOCATION	ORDER	NOTES	PAGE 20	M 31
3	41 F L5 F			
4	10 20F FO 21L			
5	S4 F 42 35L			
6	42 36L 42 37L			
7	S5 F 32 32L			
8	42 10L 42 16L			
9	L1 38L L4 F			
10	40 11L L5 F			
11	86 11F 00 F			
12	F5 11L 40 11L			
13	F5 10L 42 10L			
14	FO 35L 32 10L			
15	L5 11L 40 20L			
16	L7 F L4 F			
17	40 F F5 16L			
18	42 16L FO 36L			
19	36 16L F1 F			
20	86 11F 00 F			

LOCATION	ORDER	NOTES PAGE 21 M 31
21	23 31L 00 F	
22	85 11F 00 F	
23	32 23L 40 F	
24	16 F 40 F	
25	F5 22L 40 22L	
26	F5 23L 42 23L	
27	F0 37L 36 22L	
28	L5 22L 40 29L	
29	85 11F 00 F	
30	F4 F 40 F	
31	L3 F 32 F	
32	FF 16F 42 23L	
33	L1 39L L4 F	
34	40 22L 26 22L	
35	NO 11L L5 F	
36	77 F L4 F	
37	S2 23L 40 F	
38	9L 4085L 00 F	

LOCATION	ORDER	NOTES
39	KO 4085L OO F 24189N	PAGE 22 M 31