

UNIVERSITY OF ILLINOIS
DIGITAL COMPUTER

AUXILIARY
LIBRARY ROUTINE E 7 - 253

TITLE: Simultaneous Integration by Simpson's Rule (DOI or SADOI)
 TYPE: Closed
 NUMBER OF WORDS: 49
 TEMPORARY STORAGE: 0, 1
 ACCURACY: $\pm 2^{-39}$ + truncation error
 DURATION: $4 + (5 + d)n$ milliseconds where d is the duration of the auxiliary routine.

DESCRIPTION: Identical to code E3 except two integrals are computed.
 ENTRY: Identical to code E3, i.e., place a in location 0 and b in A and enter with

q	50 pF
	50 qF
q + 1	26 (E7)
	00 nF

where p is the location of the closed auxiliary subroutine which calculates $f_1(x)$ and $f_2(x)$ and n is the number of divisions of the interval of integration. n even.

AUXILIARY SUBROUTINE: This must be a closed routine, placed at p, which takes x_1 from A and places $f_1(x_1)$ in 0 and $f_2(x_1)$ in A.

RESULTS: Control returned to the left side of q + 2 with

$$\frac{1}{b-a} \int_a^b f_1(x) dx \text{ in location 0 and in the Accumulator}$$

$$\frac{1}{b-a} \int_a^b f_2(x) dx \text{ in Q.}$$

DATE: January 15, 1959
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APPROVED BY: <i>J. Snydal</i>

LOCATION	ORDER		NOTES	PAGE 1
0	00 K(E7) L0 F 40 40L		(b - a)	
1	L5 F 40 41L		a	
2	41 42L K5 6F		Clear counter	
3	42 5L L4 37L		q + 1	
4	42 36L 46 11L		Link p	
5	46 20L L5 F			
6	L0 39L 40 44L		n	
7	L4 44L L4 44L			
8	40 43L 41 45L		3n Clear	
9	41 47L 26 10L		Waste	
10	L5 41L 50 10L			
11	26 F 40 48L		$f_2(x_0)$	
12	L5 F 40 46L		$f_1(x_0)$	
13	F5 42L 40 42L		Step m	
14	F0 44L 36 30L		End?	
15	50 40L 75 42L			
16	10 1F 32 17L		u_i	
17	L4 42L 66 44L			

LOCATION	ORDER	NOTES	PAGE 2
18	S5 F S4 F		
19	L4 41L 50 19L		
20	26 F 40 1F		$f_2(u_1)$
21	50 38L L5 46L		
22	74 F L4 45L		F_1'
23	40 45L S5 F		
24	40 46L 50 38L		
25	L5 48L 74 1F		F_2'
26	L4 47L 40 47L		
27	S5 F 40 48L		
28	L5 2L L0 38L		Switch
29	42 38L 26 13L		
30	50 F L5 46L		
31	70 37L L4 45L		F_1
32	66 43L S5 F		
33	40 F 50 1F		
34	L5 48L 70 37L		F_2
35	L4 47L 66 43L		

LOCATION	ORDER		NOTES	PAGE 3
36	L5 F			
	26 F		Out	
37	00 F		}	
	00 1F			Constants
40	00 F			
	00 4F			
41	26 L			
	00 F			
42	00 F			
	00 F		(b - a)	
41	00 F		a	
	00 F		m	
43	00 F		3n	
	00 F		n	
44	00 F			
	00 F		Temporary storage	
45	00 F		"	"
	00 F		Temporary storage	
46	00 F		"	"
	00 F		Temporary storage	
47	00 F		"	"
	00 F		Temporary storage	
48	00 F		"	"
	00 F		"	"