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NELSON RESEARCH LABORATORIES

STAFFORD
MATHEMATICS DEPARTMENT.

Report No. NS t 218

Date 6. 5.58.

Reference

Order No.

Telephone:—Stafford 700.

Front Sheet.

Data Sheet 1.

Figure Sheet S6/11240.

DEUCE Subroutine No. 253 (E12)

Report by

R.A.E.

SUMMARY.

The attached document contains details of a DEUCE Subroutine which has been prepared and tested by R.A.E.

R.A. Smith

MATHEMATICS DEPARTMENT.

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NELSON RESEARCH LABORATORIES
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NS t 218

Sheet No.: 1.

Description. Second order subroutine to form $2^{-r} e^x$ to 30 b.p.
 $r \geq 0$.

Data. $2^{-q} x$ to 30 b.p. $0 \leq q \leq 11$.

Uses. A12/1 or A12/2 (Nos. 222, 244) in D.L.A.
0 13-0 0 0 in 1_{28} .

Result. $c = 2^{-r} e^x$ to 30 b.p.
Max. error $2^{-r} e^x (2^q + 1) P_1$.

N.B. The routine will give an incorrect answer without failure indication if $c \geq 2$ or if $c < 2^{-31}$.

Instructions for Use.

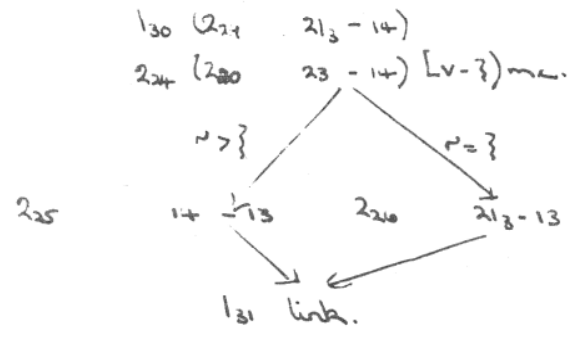
Stores Used.	13	14	15	16	21
Contents at Entry.	Link	$2^{-q}x$	-	-	-
Contents at Exit.	$2^{-r}e^x$	-	-	-	-
Occupies.	D.L. 2_{0-31}				
Entry.	2_{28} .				
Time.	38 m.s.				
Parameters.	m.c.0 $P_{(30-q)} \dots P_{32}$				
	m.c.1 Add A P_2				
	m.c.4 Add A P_2				
	m.c.10 Add $(8-2q) P_{17}$				
	m.c.20 Add $(32-r) P_{17} + 15 P_{22} + 31 P_{26}$ if $r > 0$.				
	Add P_{31} if $r = 0$.				
	m.c.23 Add $(4+q) P_{17}$				

April, 1958.

R.A.E. 435

D.L.		Track						
Card Nos.								
mc	NIS	S	D	C	W	T		
							Y	
							X	
							0	
							1	
0							2	
1							3	
2							4	
3							5	
4							6	
5							7	
6							8	
7							9	
8							Y	
9							X	
10							0	
11							1	
12							2	
13							3	
14							4	
15							5	
16							6	
17							7	
18							8	
19							9	
20							Y	
21							X	
22							0	
23							1	
24							2	
25							3	
26							4	
27							5	
28							6	
29							7	
30							8	
31							9	

228 13 - 131
 231 23 - 13
 24 26 - 16 [$\frac{1}{2} \log_2 e$]
 A8 MULT
 Q30 (23 20 - 14) [$P_{30-q} \dots P_{32}$]
 22 213 - 15
 25 25 - 233
 27 25 - 14
 210 21 - 22 I [$2q+3$] m.c.
 223 23 - 14 [$12-q$] m.c.
 28 23 - 212
 211 22021 - 2223 [$2, 23-14, 1, 32-r(y)31$] [$P_{31} P_{32}$]
 222 212 - 224
 227 229 - 14
 230 213 - 16
 21 29 - 13 [$2P_5 + 19P_{17} + 6P_{22}$]
 A9 SUM SERIES.



DEUCE Subroutine No. 253 (E12)
 e^x Fixed Point.

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