TITLE: Input a Sequence of Decimal Fractions   (DOI or SADOI)

TYPE: Closed with one program parameter

NUMBER OF WORDS: 26

TEMPORARY STORAGE: 0, 1, 2

ACCURACY: $\pm 2^{-40}$

DURATION: 4 ms per digit (input time)

DESCRIPTION: This routine at location p is called into use by the orders

q	-- nF	n is the first of the
	50 qF	sequence of locations at
q+1	26 pF	which the decimal fractions
		are stored.

It reads a sequence of decimal fractions from the tape.
Each fraction is punched on the tape as a sign, K (+) or
S (-), followed by up to 12 decimal digits; the final
fraction in the sequence is terminated by an N, J, F,
or L. When this subroutine reads one of these terminating
symbols it returns control to the main routine. Upon
leaving this routine, 0×2^{-39}, 1×2^{-39}, 2×2^{-39} or
3×2^{-39} is left in the accumulator according as whether
the terminating symbol is N, J, F or L.

This program works by bringing in the decimal fraction
a_0, a_1, a_2, ..., a_p one digit at a time. Now this number
a_0, a_1, a_2, ..., a_p = N_p/D_p where a_0 is the sign of the
number and $p \leq 12$.

When the i+1 digit is read, we have stored
$D_i/2 = D_{i-1}/2 \times 10$ in location 1 and $M_i = N_i - D_i/2$,
in location 0 where $N_i = 10 N_{i-1} + a_i$.
$D_0/2 = 5$, $M_0 = a_0 - 5$

RT: 12/14/60

DATE	July 22, 1954
CODED BY	D. J. Wheeler
APPROVED BY	J. P. Nash

LOCATION	ORDER		NOTES
	00K(N2)		
0	S5 F		Set link address and storage address
	46 8L		
1	L4 4L		
	42 11L		
2	81 4F		Read in first sign digit, a_0
	L0 25L	-10	
3	22 10L		
	40 2F		Store $a_1 - 10$
4	L5 F	$+M_i$	$M_i - N_i - D_i/2$
	66 1F	$+ D_i/2$	$M_i/D_i + 2 = N_i/D_i + 2 - 1$
5	10 1F		$N_i/D_i - 1/2$
	SJ F		
6	40 F		N_i/D_i
	L1 F	From 15	
7	40 1F		
	L5 (2)F	By 10'	Choose and store either $+ N_i/D_i$ or $- N_i/D_i$
8	40 (n)F	by 0'	
	L5 8L		
9	L4 4L		Increase storage address
	46 8L		
10	L5 2F	From 3	
	42 7L		
11	L0 23L	- 2	
	32 (q+1)F	By 1'	= N return to main routine
12	L5 24L	+ 5	
	40 1F		$D_0/2 = 5$
13	41 F		
	81 4F		Read in digit a_1
14	L0 25L	- 10	
	40 2F		Store $a_1 - 10$
15	32 6L		Check for sign or terminating symbol
	L4 24L	+ 5	
16	40 F	From 22'	Store $a_1 - 5 = M_1$, M_i
	81 4F		Read in a_i

LOCATION	ORDER			NOTES
17	50 1F			$D_1/2$ in R_2
	40 2F			Store a_1
18	L0 25L	– 10		$a_1 - 10$
	32 3L			Check for sign or terminating symbol
19	75 25L	x 10		$D_1/2$ x 10 in R_2
	85 F			
20	40 1F			Store $D_{1+1}/2 = D_1/2$ x 10
	50 25L			
21	75 F	x M_1		10 M_1 2^{-78}
	00 39F			10 M_1 2^{-39}
22	L4 2F	+ a_{1+1}		$M_{1+1} = 10 M_1 + a_{1+1}$
	26 16L			
23	00 F			
	00 2F			
24	00 F			
	00 5F			
25	00 F			
	00 10F			