TITLE	Arctan x Subroutine (DOI or SADOI)
TYPE	Closed
NUMBER OF WORDS	25
TEMPORARY STORAGE	0, 1, 2
ACCURACY	Maximum error $\pm 2^{-35}$
DURATION	20 milliseconds
DESCRIPTION	Computes arctan x for $-1 \le x < 1$ by means of a power series involving Tchebyscheff polynomials,

$$\arctan x = \sum_{i=0}^{27} a_i T_i(x),$$ where $a_i = 0$ for i even or

where $a_i = (-1)^{i+3/2} \ (2/i) \ (\sqrt{2-1})^i$ for i odd.

(See Hahn, Talbes d' Integrales Definis, Table 370,7,8).

Combining coefficients of corresponding powers of x

yields
$$\arctan x = \sum_{i=0}^{14} C_{2i-1} x^{2i-1}.$$

In use, this routine replaces A by arctan A.

DATE 7/29/54 RT:4/21/61
PROGRAMMED BY R. F. King
REVISED BY D. E. Muller
APPROVED BY *[signature]*

LOCATION	ORDER		NOTES	PAGE 1
0	00K(T4)			
	40 F			
	K5 11L			
1	42 9L			
	50 F			
2	7J F			
	40 1F			
3	L5 L			
	42 5L			
4	23 5L			
	50 2F			
5	7J 1F			
	L4 (11)L			
6	40 2F			
	F5 5L			
7	42 5L			
	L0 10L			
8	32 4L			
	50 2F			
9	7J F			
	22 ( )F			
10	LJ 1F			
	L4 25L		.5002	
11	NOF 00 4997			
	7011 9245 J		$C_{27} = -.0002\ 2099\ 0755$	
12	00F 00 1913			
	4527 67J		$C_{25} = .0019\ 1345\ 2767$	
13	NOF 00 4925			
	1097 3228 J		$C_{23} = -.0074\ 8902\ 6772$	
14	00F 00 0186			
	0530 1864 J		$C_{21} = .0186\ 0530\ 1864$	
15	NOF 00 4662			
	6451 7594 J		$C_{19} = -.0337\ 3548\ 2406$	

LOCATION	ORDER	NOTES
16	OOF 00 4925	
	4345 382 J	$C_{17} = .0492\ 5434\ 5382$
17	NOF 00 4369 .56	
	9356 8948 J	$C_{15} = -.0630\ 0643\ 1052$
18	OOF 00 7589	
	4441 137 J	$C_{13} = .0758\ 9444\ 1137$
19	NOF 00 4092	
	9642 4995 J	$C_{11} = -.0907\ 0357\ 5005$
20	OOF 00 1110	
	8319 9831 J	$C_9 = .1110\ 8319\ 9831$
21	NOF 00 3571 .642	
	4526 7988 J	$C_7 = -.1428\ 5473\ 2012$
22	OOF 00 1999	
	9988 1008 J	$C_5 = .1999\ 9988\ 1008$
23	NOF 00 1666	
	6666 9429 J	$C_3 = -.3333\ 3333\ 0571$
24	40F 00 4999	
	9999 9981 J	$C_1 = .9999\ 9999\ 9981$