CASIO PROGRAM SHEET

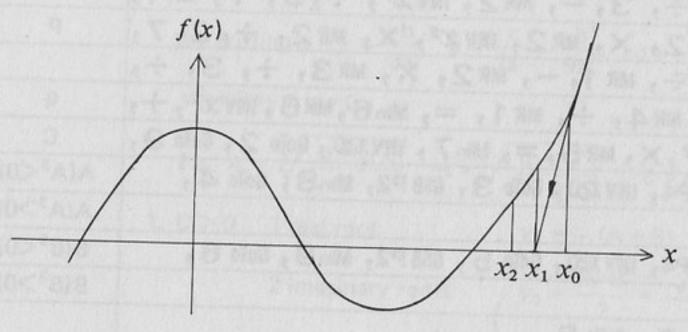
Program for

Solving a cubic equation by the Newton method

No. Mathematics—8

Description

Input the program written in the next page.



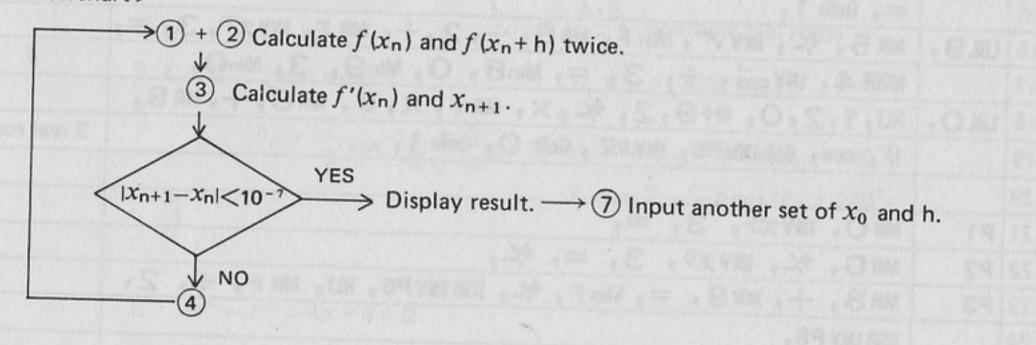
$$f(x) = ax^3 + bx^2 + cx + d$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$f'(x) = \frac{f(x+h) - f(n)}{h}$$

 $x_{\rm n}$ will be taken as an approximate solution if $\mid x_{\rm n+1}-x_{\rm n}\mid <\epsilon_{\rm 0}$.

< Flowchart >



Example

$$f(x) = x^3 + x^2 - x - 1$$

 $x_0 = 0$, $\epsilon_0 = 1 \times 10^{-7}$, $h = 0.01$

Step	Data input operation	Read-out	Remark	Step	Data input operation	Read-out	Remark
_	MODE 1		10	11		AND BUT DESCRIPTION	Telliar
1	PO	0.		12	AND DOME YEAR TO STREET	THE DIRECTION IS NOT THE	
2	(a) 1 EXE	1.		13	sebuo eice of began	to the line story	luna ma
3	(b) 1 EXE	1.		14			His S-
4	(c) 1 1 EXE	-1.		15	PRESENTATION OF THE STREET	STORT SEET BALLS	SERVICE STREET
5	(d) 1 1 EXE	-1.		16	- (e) CO (e) (e) (e) (e)	At the value of the	approach to the
6	(ϵ_0) 1 EXE 7 THE EXE	1×10 ⁻⁷		17	Total yell and bevole	of the store	lass edf
7	(x_0) 2 EXE	2.		18			
8	(h) 0.01 EXE	1.000000019	(x)	19			
9		24		20			
0	G PR						

Program for Solving a cubic equation by the Newton method

Transfer		2-201	Program Progra	Remark	No.of steps
		MODE, 2	2, (Not included in No. of steps)		
	1	PO	HLT, Min 1, HLT, Min 2, HLT, Min 3, HLT, Min 4, HLT, Min F,		
-	2	LBL 1,	HLT, Min 5, HLT, Min 6,	a no trail	
	3			AANA A AAAA A	
-	4	LBL2,	MR 5, Min 7, 2, Min O,		
	5	LBL3,	MR 1, \times , MR 5, INV x^2 , \times , MR 5, $+$, MR 2, \times , MR 5, INV x^2 ,		0.393
	6		$+, MR3, \times, MR5, +, MR4, =, Min9,$		
2	7		MR6, M+5,		
	8		INV DSZ, GoTo 4,		
7	9		GoTo 5,		
3	10	LBL4,	MR 9, Min 8, GoTo 3,	100	
	11	LBL5,	$((, MR9, -, MR8,)), \div, MR6, =, Min9,$	$f'(x_n)$	
5	12		$MR7, -, MR8, \div, MR9, =, Min8, -, MR7, =, INV ABS,$	$ x_{n+1}-x_n <\epsilon_0$	
4	13		INV X≥F, GoTo 6,		
	14		GoTo 7,		
6	15	LBL6,	MR8, Min5, GoTo 2,		
	16	LBL7,			
	17				
	18			Total	81
	19				
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	25		THE REPORT HAVE BEEN AND LANGEST HEREIN		
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Note

If "-" remains displayed perpetually the approximation does not converge because start point x_0 is wrong. Depress \square , change the value of x_0 and repeat operation from step 1.

a	-1	
b .	-2	(el) S
С	-3	983 8
d —	-4	0.00 tal a
$x_0 \longrightarrow x_n + h$	-5	

Contents in memories

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.6

·F

DSZ

h

 ϵ_0

0

2

3

4

5

6