

50146 Program Description I

Program Title Solution of a fifth- or a sixth order linear system

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Program Description, Equations, Variables

This program yields the solution of a 5th or a 6th order linear system given in the following form :

a11	a12	a13	a14	a15	a16		X1		a17
a21	a22	a23	a24	a25	a26		X2		a27
a31	a32	a33	a34	a35	a36		X3		a37
a41	a42	a43	a44	a45	a46	*	X4	=	a47
a51	a52	a53	a54	a55	a56		X5		a57
a61	a62	a63	a64	a65	a66		X6		a67

Use is made of a reduction method which yields maximum storage economy

Each row of the system is used immediately afterwards to reduce the following rows.

The program will allow the cancellation of a row before the entry of the last term.

This means that :

- row entry can be repeated in the case of entry errors
- row entry order can be changed in the case of overflow (usually due to division by zero)

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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1 FIFTH-OR SIXTH ORDER SYSTEM (A) 2

1 ÷ 4 eq.

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
	<u>Solution of a Sixth-order Linear System</u>			
1	Load card A sides 1 and 2	$a_{11} \neq 0$	A	0.00
2	Input: Enter the 28 coefficients row-wise, depressing RIS after each coefficient.	$a_{12} \div a_{17}$ $a_{21} \div a_{27}$ $a_{31} \div a_{37}$ $a_{41} \div a_{47}$	RIS RIS RIS RIS	19:25...7 $a_{21} \div a_{26} : 7$ $a_{31} \div a_{36} : 7$ $a_{41} \div a_{46} : 18$
3	Load card B sides 1 and 2		B	7
4	Input: row-wise, depressing RIS after each coefficient	$a_{51} \div a_{57}$	RIS	$a_{51} \div a_{56}$ d36
5	Load card C side 1 and 2		C	7
6	Input: row-wise, depressing RIS after each coefficient	$a_{61} \div a_{67}$	RIS	$a_{61} \div a_{66}$ X1
7	SOLUTION		E	$X_{61} \div X_{67}$ $R_6 \div R_1$
8	Control: input row-wise $a_{i1} \div a_{i5}$ depressing RIS after each coefficient		A RIS	0.00 $\sum a_{ij} X_j$
	<u>Solution of a Fifth-order Linear System</u>			
1	Load card A sides 1 and 2	$a_{11} \neq 0$	A	0.00
2	Input: row-wise, depressing RIS after each coefficient	$a_{12} \div a_{15}$ 0 a_{17} $a_{21} \div a_{25}$ 0 a_{27} $a_{31} \div a_{35}$ 0 a_{37} $a_{41} \div a_{45}$ 0 a_{47}	RIS RIS RIS RIS RIS RIS RIS RIS RIS RIS RIS	19:25... 25 7 $a_{21} \div a_{25}$ 0 7 $a_{31} \div a_{35}$ 0 7 $a_{41} \div a_{45}$ 0 18
3	Load card B side 1 and 2		f B	7
4	Input: row-wise, depressing RIS after each coefficient	$a_{51} \div a_{55}$ 0 a_{57}	RIS RIS RIS	$a_{51} \div a_{55}$ 0 X5
5	Load card C side 1 and 2		f C	$X_5 \div X_1 ***$ $R_5 \div R_1$

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5 eq.

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBLA	31 25 11			f P _→ S	31 42	
	f CL REG	31 43			RCL O	34 00	
	RIS	84			f P _→ S	31 42	
	STO 7	33 07		060	f GSB 3	31 22 03	
	1	01			RCL D	34 14	
	9	09			f P _→ S	31 42	
	h STI	35 33			RCL 1'	34 01	
	f LBL O	31 25 00			f P _→ S	31 42	
	RIS	84			f GSB 3	31 22 03	
010	RCL 7	34 07			RCL E	34 15	
	:	81			f P _→ S	31 42	
	STO (i)	33 24			RCL 2'	34 02	
	f ISZ	31 34			f P _→ S	31 42	
	h RCI	35 34		070	f GSB 3	31 22 03	
	2	02			q LBL f B	32 25 12	
	5	05			f GSB D	31 22 14	
	q X ≠ Y	32 61			RCL 6	34 06	
	GT 00	22 00			RCL 8	34 08	
	q LBL f A	32 25 11			X	71	
020	f GSB D	31 22 14			RCL 5	34 05	
	RCL 6	34 06			-	51	
	RCL 7	34 07			RCL 7	34 07	
	f P _→ S	31 42			f P _→ S	31 42	
	RCL 9'	34 09		080	RCL 3'	34 03	
	X	71			f P _→ S	31 42	
	f P _→ S	31 42			X	71	
	-	51			-	51	
	STO 0	33 00			STO 0	33 00	
	8	08			2	02	
030	h STI	35 33			1	01	
	RCL 5	34 05			h STI	35 33	
	RCL A	34 11			RCL 4	34 04	
	f GSB 2	31 22 02			RCL 9	34 09	
	RCL 4	34 04		090	f P _→ S	31 42	
	RCL B	34 12			RCL 4'	34 04	
	f GSB 2	31 22 02			f P _→ S	31 42	
	RCL 3	34 03			f GSB 4	31 22 04	
	RCL C	34 13			RCL 3	34 03	
040	f GSB 2	31 22 02			f P _→ S	31 42	
	RCL 2	34 02			RCL O'	34 00	
	RCL D	34 14			RCL 5'	34 05	
	f GSB 2	31 22 02			f P _→ S	31 42	
	RCL 1	34 01			f GSB 4	31 22 04	
	RCL E	34 15		100	RCL 2	34 02	
	f GSB 2	31 22 02			f P _→ S	31 42	
	f P _→ S	31 42			RCL 1'	34 01	
	RCL 9'	34 09			RCL 6'	34 06	
	f P _→ S	31 42			f P _→ S	31 42	
050	STO 0	33 00			f GSB 4	31 22 04	
	RCL A	34 11			RCL 1	34 01	
	RCL 8	34 08			f P _→ S	31 42	
	f GSB 3	31 22 03			RCL 2'	34 02	
	RCL B	34 12			RCL 7'	34 07	
	RCL 9	34 09		110	f P _→ S	31 42	
	f GSB 3	31 22 03			f GSB 4	31 22 04	
	RCL C	34 13			1	01	

REGISTERS

0 N2 ÷ N4	1 A17 ÷ A47	2 A16 ÷ A46	3 A15 ÷ A46	4 A14 ÷ A46	5 A13 ÷ A43	6 A12 ÷ A42	7 A11 ÷ A41	8 B23 ÷ C24	9 B24 ÷ C25
S0 B25 ÷ C16	S1 B26 ÷ C27	S2 B27	S3 C13	S4 C14 ÷ d14	S5 C15 ÷ d15	S6 C16 ÷ d16	S7 C17 ÷ d17	S8	S9 B12
A B13	B B14, B34	C B15, B35	D B16, B36	E B17, B37	I Control				

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	4	04			X	71	
	PST I	3533		170	-	51	
	FP→S	3142			RCL B	3412	
	RCL 4'	3404			RCL 5	3405	
	RCL 3'	3403			X	71	
	FP→S	3142			+	61	
	STO 0	3300			RCL 4	3404	
120	h RV	3553			-	51	
	RCL B	3412			CHS	42	
	f GSB 3	312203			STO 0	3300	
	FP→S	3142			1	01	
	RCL 5'	3405		180	8	08	
	FP→S	3142			PST I	3533	
	RCL C	3413			PRTN	3522	
	f GSB 3	312203			f LBL D	312514	
	FP→S	3142			Z	07	
	RCL 6'	3406			PST I	3533	
130	FP S	3142			f LBL 1	312501	
	RCL D	3414		D	RIS	84	
	f GSB 3	312203			STO (i)	3324	
	FP→S	3142			f DSZ	3133	
	RCL 7'	3407		190	GTO 1	2201	
	FP→S	3142			PRTN	3522	
	RCL E	3415			f LBL 2	312502	
	f GSB 3	312203			RCL 7	3407	
	8	08			X	71	
140	PST I	3533			-	51	
	RCL 8	3408			RCL 0	3400	
	STO 0	3300		2	:	81	
	RCL 9	3409			STO (i)	3324	
	RCL B	3412			f ISZ	3134	
	f GSB 3	312203		200	PRTN	3522	
	FP→S	3142			f LBL 3	312503	
	RCL 0'	3400			RCL 0	3400	
	FP→S	3142			X	71	
	RCL C	3413			-	51	
	f GSB 3	312203		3	CHS	42	
150	FP→S	3142			STO (i)	3324	
	RCL 1'	3401			f ISZ	3134	
	FP→S	3142			PRTN	3522	
	RCL D	3414			f LBL 4	312504	
	f GSB 3	312203		210	RCL 7	3407	
	FP→S	3142			X	71	
	RCL 2'	3402			PX→Y	3552	
	FP→S	3142			RCL 6	3406	
	RCL E	3415			X	71	
	f GSB 3	312203		4	-	51	
160	f LBL FC	322513			+	61	
	f GSB D	312214			CHS	42	
	FP→S	3142			RCL 0	3400	
	RCL 4'	3404			:	81	
	FP→S	3142		220	STO (i)	3324	
	RCL 7	3407			f ISZ	3134	
	X	71			PRTN	3522	
	RCL 8	3408					
	RCL 6	3406					

LABELS					FLAGS	SET STATUS		
A	B	C	D	E		FLAGS	TRIG	DISP
Bin	GSB	INPUT 25÷4: Row	INPUT		0	ON OFF		
a CORRECTION 25 Row	b CORRECTION 35 Row	c CORRECTION 45 Row	d	e	1	0 ☐ ☐	DEG ☐	FIX ☐
0 LOOP Bin	1 LOOP IN GSB	2 SUBR	3 SUBR.	4 SUBR.	2	1 ☐ ☐	GRAD ☐	SCI ☐
5	6	7	8	9	3	2 ☐ ☐	RAD ☐	ENG ☐
						3 ☐ ☐		n 222

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	g LBL B	32 25 12			RCL8'	3408	
	h SF 2	35 51 02			f P _→ S	3142	
	f LBL B	31 25 12			f GSB 3	31 22 03	
	RCL3	3403		060	f P _→ S	3142	
	RCLC	3413			RCL0'	3400	
	f GSB 5	31 22 05			RCL9'	3409	
	RCL9	3409			f P _→ S	3142	
	f PS	3142			f GSB 3	31 22 03	
	RCL5'	3405			f P _→ S	3142	
010	f P _→ S	3142			RCL1'	3401	
	f GSB 4	31 22 04			f P _→ S	3142	
	RCL2	3402			RCLA	3411	
	RCLD	3414			f GSB 3	31 22 03	
	f GSB 5	31 22 05		070	RCLB	3412	
	f P _→ S	3142			ST00	3300	
	RCL0	3400			2	02	
	RCL6	3406			2	02	
	f P _→ S	3142			h ST I	3533	
	f GSB 4	31 22 04			RCLC	3413	
020	RCL1	3401			f P _→ S	3142	
	RCL E	3415			RCL8'	3408	
	f GSB 5	31 22 05			f P _→ S	3142	
	f P _→ S	3142			f GSB 3	31 22 03	
	RCL1'	3401		080	RCLD	3414	
	RCL7'	3407			f P _→ S	3142	
	f P _→ S	3142			RCL9'	3409	
	f GSB 4	31 22 04			f P _→ S	3142	
	1	01			f GSB 3	31 22 03	
	5	05			RCL E	3415	
030	h ST I	3533			RCLA	3411	
	f P _→ S	3142			f GSB 3	31 22 03	
	RCL4'	3404			f GSB D	31 22 14	
	f P _→ S	3142			3	03	
	ST00	3300		090	h ST I	3533	
	f P _→ S	3142			1	01	
	RCL5'	3405			ST00	3300	
	RCL8'	3408			RCL4	3404	
	f P _→ S	3142			f P _→ S	3142	
	f GSB 3	31 22 03			RCL8'	3408	
040	f P _→ S	3142			f P _→ S	3142	
	RCL6'	3406			X	71	
	RCL9'	3409			CHS	42	
	f P _→ S	3142			RCL3	3403	
	f GSB 3	31 22 03		100	+	61	
	f P _→ S	3142			RCL C	3413	
	RCL7'	3407			CHS	42	
	f P _→ S	3142			f GSB 5	31 22 05	
	RCLA	3411			CHS	42	
	f GSB 3	31 22 03			f P _→ S	3142	
050	1	01			RCL2'	3402	
	2	02			RCL5'	3405	
	h ST I	3533			f P _→ S	3142	
	RCL8	3408			f GSB 4	31 22 04	
	ST00	3300		110	RCL3	3403	
	RCL9	3409			ST00	3300	
	f P _→ S	3142			8	08	

REGISTERS

0	N47	1	A47	2	A46	3	A45	4	A44	5	A43	6	A42	7	A41	8	C24	9	C25
S0	C26	S1	C27	S2	B27	S3	C13	S4	d14	S5	d15	S6	d15	S7	d14	S8		S9	A12
A	613	B	634	C	635	D	636	E	637	I	18								

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	R STI	3533			RCL8	3408	
	RCL4	3404		170	f GSB 3	312203	
	f P _→ S	3142			f P _→ S	3142	
	RCL3'	3403			RCL4'	3404	
	f P _→ S	3142			f P _→ S	3142	
	X	71			RCL9	3409	
	CHS	42			f GSB 3	312203	
120	RCL2	3402			2	02	
	+	61			3	03	
	RCL7	3414			R STI	3533	
	CHS	42			RCLC	3413	
	f GSB 5	312205		180	STO 0	3300	
	CHS	42			RCL7	3414	
	f P _→ S	3142			RCL8	3408	
	RCL3'	3403			f GSB 3	312203	
	RCL6'	3406			R RTN	3522	
	f P _→ S	3142			f LBL D	312514	
130	f GSB 4	312204			7	07	
	RCL4	3404			R STI	3533	
	RCLA	3411			f LBL 1	312501	
	X	71		D	RIS	84	
	CHS	42		190	STO(i)	3324	
	RCL1	3401			f DSZ	3133	
	+	61			GTO 1	2201	
	RCL E	3415			R RTN	3522	
	CHS	42			f LBL 3	312503	
	f GSB 5	312205			RCL 0	3400	
140	CHS	42			X	71	
	f P _→ S	3142		3	-	51	
	RCL4'	3404			CHS	42	
	RCL7'	3407			STO(i)	3324	
	f P _→ S	3142		200	f ISZ	3134	
	f GSB 4	312204			R RTN	3522	
	R F? 2	357102			f LBL 4	312504	
	R RTN	3522			RCL 7	3407	
	f P _→ S	3142			X	71	
	RCL5'	3405			R X → Y	3552	
150	f P _→ S	3142			RCL 6	3406	
	STO 0'	3300			X	71	
	f P _→ S	3142		4	-	51	
	RCL 6	3406			+	61	
	f P _→ S	3142		210	CHS	42	
	RCL8'	3408			RCL 0	3400	
	f GSB 3	312203			:	81	
	f P _→ S	3142			STO(i)	3324	
	RCL7'	3407			f ISZ	3134	
	f P _→ S	3142			R RTN	3522	
160	RCL9	3409			f LBL 5	312505	
	f GSB 3	312203			RCL 5	3405	
	f P _→ S	3142			X	71	
	RCL2'	3402		5	-	51	
	f P _→ S	3142		220	CHS	42	
	STO 0	3300			R RTN	3522	
	f P _→ S	3142					
	RCL3'	3403					
	f P _→ S	3142					

LABELS					FLAGS	SET STATUS		
A	B 6th order	C	D GSB	E	0	FLAGS		
a	b 5th-order	c	d Correction	e	1	ON OFF		
0	1	2	3 GSB	4 GSB	2	0 ☐	DEG ☐	FIX ☐
						1 ☐	GRAD ☐	SCI ☐
5 GSB	6	7	8	9	3	2 ☒	RAD ☐	ENG ☐
						3 ☐		n 222

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBL C	31 2513			-	51	
	RCL 9	3409			RCL 4	3404	
	RCL 0	3400			RCL B	3412	
	X	71		060	X	71	
	RCL E	3415			-	51	
	-	51			RCL 5	3405	
	STOE	3315			RCL D	3414	
	2	02			X	71	
	2	02			+	61	
010	h STI	3533			RCL 6	3406	
	f P _→ S	3142			f P _→ S	3142	
	RCL 8'	3408			RCL 2'	3402	
	f P _→ S	3142			f P _→ S	3142	
	STO 0	3300		070	X	71	
	RCL A	3411			-	51	
	RCL 9	3409			RCL 7	3407	
	h SF 2	355102			f P _→ S	3142	
	f GSB 6	312206			RCL 0'	3400	
	f P _→ S	3142			f P _→ S	3142	
020	RCL 3'	3403			X	71	
	f P _→ S	3142			+	61	
	RCL 8	3408			STO: 0	338100	
	h SF 2	355102			RCL 0	3400	
	f GSB 6	312206		080	STO 6	3306	
	9 LBL F E	32 2515			5	05	
	f GSB D	312214			h STI	3533	
	RCL 3	3403			RCL 3	3403	
	RCL 9	3409			RCL 8	3408	
	X	71			f GSB 6	312206	
030	RCL 1	3401			RCL C	3413	
	-	51			RCL B	3412	
	RCL 4	3404			h SF 2	355102	
	RCL C	3413			f GSB 6	312206	
	X	71		090	RCL E	3415	
	-	51			RCL D	3414	
	RCL 5	3405			f GSB 6	312206	
	RCL E	3415			f P _→ S	3142	
	X	71			RCL 3'	3403	
	+	61			RCL 2'	3402	
040	RCL 6	3406			f P _→ S	3142	
	f P _→ S	3142			h SF 2	355102	
	RCL 3'	3403			f GSB 6	312206	
	f P _→ S	3142			f P _→ S	3142	
	X	71		100	RCL 1	3401	
	-	51			RCL 0'	3400	
	RCL 7	3407			f P _→ S	3142	
	f P _→ S	3142			f GSB 6	312206	
	RCL 1'	3401			h RTN	3522	
	f P _→ S	3142			f LBL E	312515	
050	X	71			6	06	
	+	61			h STI	3533	
	STO 0	3300			f LBL 7	312507	
	RCL 8	3408			RCL (1)	3424	
	RCL 3	3403		110	f - X -	3184	
	X	71			f DSZ	3133	
	RCL 2	3402			GTO 7	2207	

REGISTERS

0	1 X51 A57 X61	2 X52 A56 X62	3 X53 A55 X63	4 X54 A54 X64	5 X55 A53 X65	6 X56 A52 X66	7	8	9
S0 f16	S1 f17	S2 C26	S3 C27	S4 d27	S5 C15	S6 C16	S7 C17	S8 C45	S9 C46
A C47	B C34	C C35	D d36	E C37	F C38	G C39	H C40	I C41	J C42

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	f LBLA	312511			X	71	
	1	01		170		51	
	h STI	3533			h F?2	357102	
	0	00			CHS	42	
	f LBL3	312503			STO(i)	3324	
	RIS	84			f DSZ	3133	
	RCL(i)	3424			h RTN	3522	
120	X	71			h F?0	357100	
	+	61			GTO8	2208	
	f ISZ	3134			RIS	84	
	GTO9	2209			GTOE	2215	
	h RTN	3522		180	f LBLB	312512	
	g LBLFC	322513			RCL6	3406	
	h STO	355100			STO9	3309	
	RCL9	3409			RCL5	3405	
	STO0	3300			STO8	3308	
	STO5	3305			RCL4	3404	
130	4	04			STO7	3307	
	h STI	3533			RCL1	3401	
	RCLA	3411			STO6	3306	
	f P→S	3142			RCL2	3402	
	RCL8	3408		190	STO5	3305	
	f P→S	3142			RCL3	3403	
	f GSB6	312206			STO4	3304	
	RCLE	3415			RCL7	3407	
	RCLC	3413			STO3	3303	
	h SF2	355102			RCL8	3408	
140	f GSB6	312206			STO2	3302	
	f P→S	3142			RCL9	3409	
	RCL4'	3404			STO1	3301	
	RCL2'	3402			h RTN	3522	
	f P→S	3142		200	g LBLFB	322512	
	f GSB6	312206			RCL5	3405	
	f P→S	3142			STO8	3308	
	RCL7'	3407			RCL4	3404	
	RCL5'	3405			STO7	3307	
	f P→S	3142			RCL1	3401	
150	h SF2	355102			STO5	3305	
	f GSB6	312206			RCL2	3402	
	f LBL8	312508			STO4	3304	
	h SFO	356100			RCL7	3407	
	5	05		210	STO2	3302	
	h STI	3533			RCL8	3408	
	f GSB7	312207			STO1	3301	
	h RTN	3522			h RTN	3522	
	f LBLD	312514					
	7	07					
160	h STI	3533					
	f LBL1	312501					
	RIS	84					
	STO(i)	3324					
	f DSZ	3133					
	GTO1	2201		220			
	h RTN	3522					
	f LBL6	312506					
	RCL0	3400					

LABELS					FLAGS	SET STATUS		
A CONTROL	B	C 6th.order	D GSB INPUT	E DISPLAY	0	FLAGS	TRIG	DISP
a	b	c 5th.order	d	e CORRECTION	1	ON OFF		
0	1 LOOP INPUT	2	3	4	2	0 ☒ ☐	DEG ☐	FIX ☐
5	6 GSB	7 LOOP DISPL.	8	9	3	1 ☐ ☐	GRAD ☐	SCI ☐
						2 ☒ ☐	RAD ☐	ENG ☐
						3 ☐ ☐		n 213

50146 Program Description I

Program Title LINEAR SYSTEMS OF ORDER HIGHER THAN THE SIXTH ORDER $6 < n \leq 10$

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Program Description, Equations, Variables By means of this program a linear system of the n -order can be solved ($6 \leq n \leq 10$).

The computation is done in three successive stages:

1e stage: card D Reduction of the system to the sixth- or fifth- order by elimination of the $(n-6)$ unknowns.

2e stage: card A÷C Solution of the sixth- or fifth- order system

3e stage: card D Evaluation of the $(n-6)$ unknowns.

The 1 st. and 2 nd stages are performed with card D.

The 2 nd stage uses the sixth order equation solution cards A÷C

The reduction of the 1 st. stage occurs in successive steps

The coefficients of the n -order system are entered and so we obtains the reduced system of the $(n-2)$ - order coefficients.

The latter are re-entered and now the $(n-4)$ - order system coefficients are obtained etc.

OPERATING PROCEDURE: 10- order system $\Rightarrow$ 8-order system $\Rightarrow$ 6-order system
9- order system $\Rightarrow$ 7-order system $\Rightarrow$ 5-order system

a11	a12	---	a1K	a1n	X1	a1,n+1	b1K=a1K/a11 ($K=2 \div n+1$)
a11	a12				Xi	ai,n+1	b1K=ai1b1K-ai1 TIK
an1	an2	---	anK	ann	Xn	an,n+1	ai1b12-ai2= NIK
							BIK=biK-b2K

Operating Limits and Warnings

- The first row entered must not begin with zero ($a11 \neq 0$), if necessary change the order of the rows.

- Correction procedure: To correct the entry of a number, depress:

A: for the first row } and re-enter all the data of the row

B: for the second row } from the beginning.

C: for the following rows }

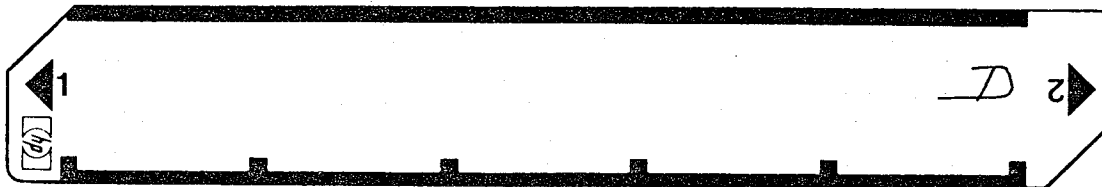
This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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LINEAR SYSTEM OF ORDER $6 < n \leq 10$

row 1 row 2 row 3 b2k displ.

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	1 st STAGE : enter card D SIDE 1 Enter row-wise the coefficients and the constant term of:			
2	The first row	$a_{11} \neq 0$ $a_{12} \div a_{1, n+1}$	A RIS	0.00 b1H
3	The second row	a_{21} a_{22} $a_{23} \div a_{2, n+1}$	A B RIS	a_{21} M2H b2H
4	The following $n-2$ rows The computer gives the coefficients of the system reduced to order $(n-2)$ after insertion of each datum	a_{i1} a_{i2} $a_{i3} \div a_{i, n+1}$	$\uparrow$ C RIS	a_{i1} MiH KiH ($i = 3 \div n$) ($H = 3 \div n+1$)
5	If the order $(n-2) > 6$: repeat the steps 2-4 and reenter the coefficients of the $(n-2)$ -order system In this way the coefficients of the $(n-4)$ -order system will be obtained. Carry out further reductions until a sixth- or a fifth-order system is obtained.			
6	2 nd STAGE : USE CARDS A-C side 1 and 2 To solve the fifth- or sixth order system obtained from the first stage reductions. The computer will respectively display the values of the 5 unknowns : $x_{n-4}; x_{n-3}; x_{n-2}; x_{n-1}; x_n$ the 6 unknowns : $x_{n-5}; x_{n-4}; x_{n-3}; x_{n-2}; x_{n-1}; x_n$ NOTE : To recorder the unknowns in the memorie for weither calculation in the 3 rd stage : Depress.	$m = 6$ $m = 5$	B f B	
7	3 rd STAGE : enter card D side 1		D	n
8	Enter	$n = 6 \text{ or } 5$	RIS	0.00
9	Enter row-wise the coefficients	1 $b_{23} \div b_{2, n+1}$	RIS	$\sum b_{2H} X_H$ X_{***} $n+1$
10	Enter row-wise the coefficients	$a_{i1} \div a_{i, n+1}$	RIS	$\sum a_{iH} X_H$ X_{i***} $n+2$
11	Do display the unknowns x		E	$X_H ***$ $n+2$

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBLA	312511			RCL E	3415	
	f CL REG	3143			R ST I	3533	
	STO E	3315			RIS	84	
	O	00		060	STO D	3314	
	R ST I	3533			O	00	
	f LBLD	312500			f LBL 5	312505	
	RIS	84			RIS	84	
	RCL E	3415			RCL(i)	3424	
	:	81			X	71	
010	STO(i)	3324			+	61	
	f ISZ	3134			f DSZ	3133	
	GTO O	2200			GTO 5	2205	
	f LBL B	312512			RIS	84	
	R SFO	355100		070	-	51	
	f GSB 3	312203			CHS	42	
	f LBL C	312513			RCLD	3414	
	R CLO	356100			:	81	
	f LBL 3	312503			STO D	3314	
	O	00			RCL E	3415	
020	R ST I	3533			-	01	
	R R V	3553			+	61	
	R X2Y	3552			STOE	3315	
	STOE	3315			R ST I	3533	
	RCL(i)	3424		080	R R V	3553	
	X	71			STO(i)	3324	
	-	51			f-X-	3184	
	CHS	42			GTO 4	2204	
	STO D	3314			f LBLE	312515	
	f ISZ	3134			RCL E	3415	
	f LBL 1	312501			R ST I	3533	
	RIS	84			f LBL 6	312506	
	RCL E	3415			RCL(i)	3424	
	RCL(i)	3424			f-X-	3184	
	X	71		090	f DSZ	3133	
	-	51			GTO 6	2206	
	CHS	42			R RTN	3522	
	RCLD	3414			f LBLFA	322511	
	:	81			STOE	3315	
040	R F?O	357100			R ST I	3533	
	GTO 2	2202			f LBL 7	312507	
	f P<S	3142			RIS	84	
	RCL(i)	3424			STO(i)	3324	
	f P<S	3142			f DSZ	3133	
	-	51		100	GTO 7	2207	
	f ISZ	3134			f LBLFB	322512	
	GTO 1	2201			RCL E	3415	
	R RTN	3522			R ST I	3533	
	f LBL 2	312502			O	00	
	f P<S	3142			f LBL 8	312508	
050	STO(i)	3324			RIS	84	
	f P<S	3142			RCL(i)	3424	
	f ISZ	3134			X	71	
	GTO 1	2201			+	61	
	f LBLD	312514		110	f DSZ	3133	
	STOE	3315			GTO 8	2208	
	f LBL 4	312504			R RTN	3522	

REGISTERS

0	1	2	3	4	5	6	7	8	9
B1H	B2H	B3H	B4H	B5H	B6H	B7H	B8H	B9H	B10H
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
B23	B24	B25	B26	B27	B28	B29	B2.10	B2.11	B2.12
A	B	C	D	E	I				
			B2H;N1H	4H 4H					

STEP

KEY ENTRY

KEY CODE

COMMENTS

STEP

KEY ENTRY

KEY CODE

COMMENTS

[illegible]

LABELS					FLAGS	SET STATUS		
A	B	C	D	E		FLAGS	TRIG	DISP
COMPOT X _u X _v > 6	Comp. b _{2u}	Comp. b _{1u}	Comp.	displ X _i	0			
a checking	b checking	c	d	e	1	ON OFF		
0 look	1 Comp. b _{1u}	2 b _{2u} → (i)'	3 SBR	4 look	2	0 ☐ ☐	DEG ☐	FIX ☐
						1 ☐ ☐	GRAD ☐	SCI ☐
						2 ☐ ☐	RAD ☐	ENG ☐
5 look	6 look	7 look	8 look	9	3	3 ☐ ☐		n _____

The solution of the following 6-order linear system,
given in matrix form:

$$AX=B \Rightarrow \begin{bmatrix} 3 & 4 & 2 & 6 & 7 & 9 \\ 2 & -3 & 4 & 5 & 6 & 12 \\ 3 & 3 & 4 & -2 & 5 & 16 \\ 1 & 3 & 2 & 2 & 3 & 19 \\ 4 & 6 & 5 & -3 & -4 & 20 \\ 1 & 5 & 3 & 2 & 6 & 22 \end{bmatrix} X = \begin{bmatrix} 25 \\ 18 \\ 35 \\ -10 \\ 17 \\ 70 \end{bmatrix} \Rightarrow X = \begin{bmatrix} -42.34 \\ 17.53 \\ 51.31 \\ 1.51 \\ 5.35 \\ -7.47 \end{bmatrix}$$

Keystrokes Outputs Keystrokes Outputs

Enter card A sides 1 and 2

	A	0.00
3	R/S	19
4	R/S	25
2	R/S	25
6	R/S	25
7	R/S	25
9	R/S	25
25	R/S	7

2	R/S	2
3 CHS	R/S	-3
4	R/S	4
5	R/S	5
6	R/S	6
12	R/S	12
18	R/S	7

3	R/S	3
	R/S	3
4	R/S	4
2 CHS	R/S	-2
5	R/S	5
16	R/S	16
35	R/S	7

1	R/S	1
3	R/S	3
2	R/S	2
	R/S	2
3	R/S	3
19	R/S	19
10 CHS	R/S	-18

Enter card B sides 1 and 2

	B	7
4	R/S	4
6	R/S	6
5	R/S	5
3 CHS	R/S	-3
4 CHS	R/S	-4
20	R/S	20
17	R/S	8.09 = d36

Enter card C sides 1 and 2

	C	7
1	R/S	1
5	R/S	5
3	R/S	3
2	R/S	2
6	R/S	6
22	R/S	22
70	R/S	-42.34 = X1

	E	-7.47 *** X6
		5.35 *** X5
		1.51 *** X4
		51.31 *** X3
		17.53 *** X2
		-42.34 *** X1
		0.00

3	R/S	-127.01
4	R/S	-56.91
2	R/S	45.70
6	R/S	57.78
7	R/S	92.23
3	R/S	25 = a17
	A	0.00
4	R/S	-169.36

PRINT

The solution of the following 5-order linear system,
given in matrix form:

$$AX=B \Rightarrow \begin{array}{c|ccccc|c} 3 & 4 & 2 & 6 & 7 & X_1 & 25 \\ 2 & -3 & 4 & 5 & 6 & X_2 & 18 \\ 3 & 3 & 4 & -2 & 5 & X_3 & 35 \\ 1 & 3 & 2 & 2 & 3 & X_4 & -10 \\ 4 & 6 & 5 & -3 & -4 & X_5 & 17 \end{array} \Rightarrow X = \begin{array}{c} 22.25 \\ -4.62 \\ -9.14 \\ -3.54 \\ 2.31 \end{array}$$

Keystrokes Outputs

Enter Card A Sides 1 and 2

A	0.00
3	R/S
4	R/S
2	R/S
6	R/S
7	R/S
0	R/S
25	R/S

2	R/S
3 CHS	R/S
4	R/S
5	R/S
6	R/S
0	R/S
18	R/S

3	R/S
	R/S
4	R/S
2 CHS	R/S
5	R/S
0	R/S
35	R/S

1	R/S
3	R/S
2	R/S
	R/S
3	R/S
0	R/S
10 CHS	R/S

Keystrokes Outputs

Enter Card B Sides 1 and 2.

fb	7
4	R/S
6	R/S
5	R/S
3 CHS	R/S
4 CHS	R/S
0	R/S
17	R/S

Enter Card C Sides 1 and 2

fc	2.31 *** X5 R5
	-3.54 *** X4 R4
	-9.14 *** X3 R3
	-4.62 *** X2 R2
	22.25 *** X1 R1

	0.00
3	R/S
4	R/S
2	R/S
6	R/S
7	R/S

	25 = a16
A	0.00
4	R/S
6	R/S
5	R/S
3 CHS	R/S
4 CHS	R/S

	17.00 = a56
A	0.00
	⋮
	⋮

50	146	-2	6	3	-7	4	-3	8	X_1	112	1
		3	1	-1	-5	7	-9	5	X_2	100	3
		6	7	-5	7	-5	2	4	X_3	170	5
		8	6	5	6	-3	3	8	X_4	278	7
		-6	-2	1	0	1	3	-1	X_5	82	9
		9	8	-3	6	1	-5	2	X_6	70	11
		2	1	-6	-8	3	5	1	X_7	29	13
		8	5	4	1	-4	2	3	X_8	75	15

Load card D side 1

5A 0.0000	-2 RIS -0.4000	6 RIS 1.2000	3 RIS 0.6000	-7 RIS -1.4000	4 RIS 0.8000	-3 RIS -0.6000	8 RIS 1.6000	112 RIS 22.4000
3A -2.2000	1 B -2.0909	-1 " -2.0909	-5 " -3.0909	7 " 5.0909	-9 " -5.1818	5 " 3.0909	7 " 1.0000	100 " 14.9091
6A -9.4000	7 C 0.7930	-5 " 0.7930	7 " 3.4526	-5 " -4.7292	2 " 4.8839	4 " -2.2824	6 " -1.3830	170 " -11.1219
8A -9.2000	6 C 1.5909	5 " 1.5909	6 " 3.2213	-3 " -4.1996	3 " 4.8123	8 " -1.6996	5 " -1.8478	278 " -4.1700
-6A 4.4000	-2 C 0.2273	1 " 0.2273	0 " 1.2727	1 " -3.4091	3 " 3.4091	-1 " -2.0455	4 " -4.0909	82 " -64.0909
9A -11.600	8 C 0.9013	-3 " 0.9013	6 " 3.1426	1 " -3.9185	-5 " 4.1301	2 " -2.4530	2 " -2.0690	70 " -26.2539
-2A -1.8000	1 C -2.5758	-6 " -2.5758	-8 " -2.0202	3 " -1.8687	5 " 7.0707	1 " -1.8687	1 " -2.2222	29 " -23.6865
-8A -8.2000	5 C 1.4080	4 " 1.4080	1 " 2.6275	-4 " -4.2129	2 " 4.6452	3 " -2.1397	0 " -2.5610	75 " -27.6162

Sixth-order system

Load card A÷C ; DSP 4 ; reorder : B (card C)

E: $X_8 = 15,0005$ Reg. 6 → 1 $X_5 = 8,9987$ Reg. 5 → 4
 $X_7 = 12,9982$ " 5 → 2 $X_4 = 6,9981$ " 2 → 5
 $X_6 = 10,9981$ " 11 → 3 $X_3 = 5,0002$ " 1 → 6

50 1466

D 6,0000
 1 RIS 0,0000
 2.0909 CHS " -10,4550
 3,0909 CHS " -32,0854
 5,0909 " 13,7213
 5.1818 CHS " -43,2715
 3,0909 " 3,0933
 1 " 11,9052
 14,9091 " 3,0039 *** = $X_2 \rightarrow \text{Reg. 7}$

7,0000
 5 RIS 0,0000
 2 CHS " 23,9938
 6 " 44,9878
 3 " -17,9964
 7 CHS " 25,9982
 4 " -12,9965
 3 CHS " 107,0073
 8 " 0,9985 *** = $X_1 \rightarrow \text{Reg. 8}$
 112 " 8,000

 $5X_1 + 107 = 112$ COMPUTATION OF X_2 AND X_1

-2.0909	x 5	-10,4545	-10,4
-3,0909	x 7	-21,6363	-21,6
5,0909	x 3	15,2727	15,2
-5,1818	x 11	-56,9998	-56,9
3,0909	x 13	40,1817	40,1
1	x 15	15	15

 $11,9 + X_2 = 14,90 \rightarrow X_2 = 3$

5	x		
-2	x 3	-6	-6
6	x 5	30	24
3	x 7	21	45
-7	x 9	-63	-18
4	x 11	44	26
-3	x 13	-39	-13
8	x 15	120	107

E 0,9985 *** = X_1 Reg. 8 DO DISPLAY THE UNKNOWNNS
 3,0039 *** = X_2 " 7
 5,0002 *** = X_3 " 6 X FROM THE MEMORIES
 6,9981 *** = X_4 " 5
 8,9977 *** = X_5 " 4
 10,9987 *** = X_6 " 3
 12,9982 *** = X_7 " 2
 15,0005 *** = X_8 " 1

CHECKING OF THE EQUATIONS

8 fA 8,0000
 0,9985 RIS 0,9985
 3,0039 " 3,0039
 5,0002 " 5,0002
 6,9981 " 6,9981
 8,9977 " 8,9977
 10,9987 " 10,9987
 12,9982 " 12,9982
 15,0005 " 15,0005

If this operation follows
 the computation of LBLD
 this input is not required

DSP 2 fB 0,00
 5 RIS 4,99
 2 CHS " -1,01
 6 " 28,99
 3 " 49,98
 7 CHS " -13,00
 4 " 30,99
 3 CHS " -8,00
 8 " -112

fB 0,00
 8 RIS 7,99
 5 " 23,01
 ; "

50

5	2	6	3	-7	4	-3	8	9		X_1	130	1	Reg.
5	1	-1	-5	7	-9	5	7	6		X_2	112	3	9
6	7	-5	7	-5	2	4	6	3		X_3	176	5	8
8	6	5	6	-3	3	8	5	2		X_4	282	7	7
-6	-2	1	0	1	3	-1	4	1	*	X_5	84	9	6
9	8	-3	6	1	-5	2	2	0		X_6	70	11	5
2	1	-6	-8	3	5	1	1	6		X_7	41	13	4
8	5	4	1	-4	2	3	0	9		X_8	93	15	3
1	3	7	6	9	5	1	8	5		X_9	366	2	2

$\Rightarrow X =$

Load card D side 1

5A	-2 RIS	6 RIS	3 RIS	-7 RIS	4 RIS	-3 RIS	8 RIS	9 RIS	130 RIS	IV
1(0.0000)	-0.4	1.2	0.6	-1.4	0.8	-0.6	1.6	1.8	26	
3A	1 B	-1 RIS	-5 RIS	7 RIS	-9 RIS	5 RIS	7 RIS	6 RIS	112 RIS	III
1(-2.2)	-2.0909	-3.0909	5.0909	-5.1818	3.0909	1	0.2727	15.4545		
6A	7 C	-5 RIS	7 RIS	-5 RIS	2 RIS	4 RIS	6 RIS	3 RIS	176 RIS	II
0(-3.4)	0.793A	3.4526	-4.7292	4.8839	-2.2824	-1.3830	-1.1025	-13.3269		
	1(0.0000)	4.3551	-5.3637	6.1588	-2.8782	-1.744	-1.3903	-16.8057		
8A	6 C	5 RIS	6 RIS	-3 RIS	3 RIS	8 RIS	5 RIS	2 RIS	282 RIS	I
0(-9.2)	1.5903A	3.2213B	-4.1996	4.8123	-1.6996	-1.8478	-1.6206	-7.4117		
		1(3.7059)	-1.4272	1.3456	-0.7771	-0.2501	-0.1596	-5.2156		
-6A	-2 C	1	0	1	3	-1	4	1	84	
0(4.4)	0.2273A	2.2727C	-3.4091	3.4091	-2.0455	-4.0303	-2.9545	-70		
		0(-1.2834)	-0.1733	0.2204	-0.3073	-2.6293	-1.8968	-46.3638		
9A	8 C	-3	6	1	-5	2	2	0	70	
0(-11.6)	0.9013A	3.1426C	-3.9185	4.1301	-2.453	-2.069	-1.6693	-29.5925		
		0(0.7815)	-0.4366	0.4724	0.5965	0.8862	0.6922	23.6935		
2A	1 C	-6	-8	3	5	1	1	6	41	
0(-1.8)	-2.5758A	-2.0202C	-1.8687	7.0707	-1.8687	-2.2222	1.0606	-21.5657		
		0(-9.1344)	-0.4468	1.1488	-0.2325	-0.4802	-0.1146	-1.8380		
8A	5 C	4	1	-4	2	3	0	9	93	
0(-8.2)	1.4081A	2.6275C	-4.2129	4.6452	-2.1397	-2.561	-0.9313	-29.4789		
		0	0.2327	-0.1961	0.231	0.2802	-0.1334	6.8762		
1A	3 C	7	6	9	5	1	8	5	366	
0(-3.4)	3.7968A	4.6791C	-2.0321	6.4171	-2.6203	0.8824	0.6684	84.5455		
		11.8516	-0.3119	0.086	0.0761	-0.3831	-0.3422	-7.3020		

Load card A ÷ C for computation of $X_9 \div X_5$ and record the X-values for

E : $X_9 = 1.9976$ R5 $\rightarrow$ R4
 $X_8 = 15.0024$ R4 $\rightarrow$ R2
 $X_7 = 12.9980$ R3 $\rightarrow$ R3

$X_6 = 11.001$ R2 $\rightarrow$ R4
 $X_5 = 8.997$ R1 $\rightarrow$ R5

50 146

5	D	
1	RIS	
1,4272 CHS	"	
1,3456	"	
0,7771 CHS	"	
0,2501 CHS	"	
0,1596 CHS	"	
5,2156 CHS	"	6,9959***=X4
		6,000 Reg X4
1	"	0,0000
4,3551	"	30,4631
5,9637 CHS	"	-23,1925
6,1588	"	44,5552
2,8782 CHS	"	7,1444
1,744 CHS	"	-19,0197
1,3903 CHS	"	-21,7970
16,8057 CHS	"	4,9973***=X3
		7,000 Reg X3
1	"	0,0000
2,0909 CHS	"	-10,4363
3,0909 CHS	"	-32,0566
5,0909	"	13,7464
5,1818 CHS	"	-43,2541
3,0909	"	-31,0786
1	"	11,9237
0,2727	"	12,4685
15,4545	"	2,9860***=X2
		8,000 Reg X2
5	"	0,0000
2 CHS	"	-5,9720
6	"	23,9757
3	"	44,9601
7 CHS	"	-18,0191
4	"	25,9815
3 CHS	"	-13,0125
8	"	107,0064
9	"	124,9848
130	"	1,0030***=X1
		9,000 Reg X1

CHECKING OF EQUATION 1

9	fA	9,00
	fB	0,00
5		5,00
2 CHS		-1,00
6		29,00
3		50,00
7 CHS		-13,00
4		31,00
3 CHS		-8,00
8		119,00
9		130,00 OK
	fB	etc....

X1	X2	X3	X4
8,927	11,001	12,948	15,002
1,9576			

1	1,4272	1,3456	0,7771	0,2501	0,1536	
1	4,3551	5,9637	6,1588	2,8782	-1,744	-1,3903
1	2,0909	-3,0909	5,0909	5,1818	3,0909	1
1	-5,9720	23,9757	44,9601	-18,0191	25,9815	-13,0125
1	107,0064	124,9848	1,0030			

IV	III	II	I
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