REVISION NOTICE

This description replaces previous descriptions of "Matrix Inversion 4," program D1-139.0. Program references have been changed to current designations.

FUNCTION

"Matrix Inversion 4" enables the source program to replace the elements of a square matrix with the elements of its inverse. Matrices of any rank greater than one will be accommodated. The routine is entered and left in machine language, but it uses Floating Point Interpretive System 4, program H1-24.3 for all calculations.

INPUT

The elements of a square matrix are stored in consecutive locations on the memory drum beginning in Mo. The elements must be in double precision floating point format.

OUTPUT

The elements of the inverse matrix are stored in consecutive locations, beginning in Mo, in double precision floating point format.

MATRIX INVERSION 4

CALLING SEQUENCE

Location	Order	Address
a - 1	E	0000
a	R	Lo
a + 1	U	Lo
a + 2	Z	Lo of source program
a + 3	Z	Mo
a + 4	Z	N
a + 5	etc.	

The E0000 order in (a - 1) is required only if the previous instructions are interpreted by the source program. N, in (a + 4), is the rank of the matrix.

TIME

Approximately 2.2. N^3 milliseconds are required.

STORAGE

2 tracks and 13 sectors (141 words) are required in memory for instructions and constants. No temporary storage is used. Although only N^2 sectors are required for the matrix elements, this routine requires $N^2 + N$ sectors beginning in Mo.

NOTES

Matrices of rank greater than 30 can not be inverted due to machine storage limitations.

D1-0152
D1-139.0

Royal McBee Corporation

ELECTRONIC COMPUTER DEPARTMENT

JOB # 0152

DOUBLE PRECISION FLOATING POINT MATRIX INVERSION

FUNCTION

To replace the elements of a square matrix with the elements of its inverse. Matrices of any rank greater than one will be accomodated. The routine is entered and left in machine language, but it uses the Double Precision Floating Point (DPFP) program ( ), for all calculations.

INPUT

The elements of a square matrix in consecutive locations on the drum, beginning in Mo. The elements must be in Double Precision Floating Point form.

OUTPUT

The elements of the inverse matrix in consecutive locations, beginning in Mo, in DPFP form.

CALLING SEQUENCE

Location	Order	Address
a - 1	E	0000
a	R	Lo
a + 1	U	Lo
a + 2	Z	Lo of DPFP
a + 3	Z	Mo
a + 4	Z	n
a + 5	etc.	

The E0000 order in a - 1 is required only if the previous instructions are interpreted by the DPFP program. N, in a + 4, is the rank of the matrix.

TIME

Approximately $2.2\ n^3$ seconds.

STORAGE

Two tracks and 13 sectors are required for instructions and constants. No temporary storage is used. Although only n^2 sectors are required for the matrix elements, the routine requires $n^2 + n$ sectors beginning in Mo.

NOTES

Matrices of rank greater than 30 can not be inverted due to machine storage limitations.

LGP-30 CODING SHEET

PREPARED FOR

JOB NO	PROGRAM NO.	PROGRAM PREPARED BY	PROGRAM CHECKED BY
0152		C.L.	

PROBLEM: DPFP Matrix Inversion

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION OPERATION	INSTRUCTION ADDRESS	STOP	CONTENTS OF ADDRESS	NOTES
		0000	BC	J			
		0001	Y	0153			
		0002	Y	0154			
		0003	Y	0032			
		0004	Y	0033			
		0005	Y	0107			
		0006	Y	0121			
		0007	Y	0122			
		0008	Y	0108			
		0009	Y	0113			
		0010	Y	0114			
		0011	B	0000			
		0012	A	0106			1@29
		0013	Y	0026			
		0014	A	0106			1@29
		0015	Y	0028			
		0016	A	0106			1@29
		0017	Y	0058			
		0018	U	0026			
		0019	BC	J			
		0020	SR	2			
		0021					Ctr
		0022	XZ	0003			3@29
		0023	XZ	0006			6@29
		0024					3"
		0025					3(n+1)
		0026	BC	J			
		0027	Y	0035			
		0028	BC	J			
		0029	N	0022			
		0030	U	0200			
		0031	Y	0124			

Royal McBee Corporation
DATA PROCESSING DIV.
PORT CHESTER, NEW YORK

FORM LP-10

CARRIAGE RETURN

LGP-30 CODING SHEET

PREPARED FOR:

PAGE: 2

JOB NO.: 0152 | PROGRAM NO.: | PROGRAM PREPARED BY: | PROGRAM CHECKED BY: | DATE: 1-

PROBLEM: D. P. F. P. Matrix Inversion | TRACK:

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION OPERATION	INSTRUCTION ADDRESS	STOP	CONTENTS OF ADDRESS	NOTES
	'						
	'	☒					
		0032	RC	J	'		
		33	UC	J	'		
		34	B0210		'	1	
		35	DC	J	'	☒ A11	
		36	HC	J	'	An+1,n	
		37	XE0000		'		
		38	B0035		'		
		39	A0022		'	☒ 3@29	
		40	Y0156		'		
		41	A0163		'	3(n²-1)	
		42	Y0157		'		
		43	S0124		'	☒	
		44	T0153		'		
		45	B0156		'		
		46	Y0115		'		
		47	Y0123		'	☒	
		48	S0020		'	5(mo+n²	
		49	T0062		'		
		50	B0019		'	B(mo+n²	
		51	Y0109		'	☒	
		52	S0024		'	3n	
		53	Y0110		'		
		54	S0019		'	B(mo+n²	
		55	T0107		'	☒	
		56	P0021		'	Ck	
		57	S0022		'	3@29	
		58	TC	J	'		
		59	C0021		'	☒ Ck	
		60	Y0032		'		
		61	XR0000		'	3@15	
		62	B0020		'	mo+n²	
		63	Y0116		'	☒	

FORM LP-12

☒ CARRIAGE RETURN

PORT CHESTER, NEW YORK

LGP-30 CODING SHEET

PREPARED FOR				PAGE 3 OF 5
JOB NO. 0152	PROGRAM NO	PROGRAM PREPARED BY C. H	PROGRAM CHECKED BY:	DATE 1-26-60
PROBLEM C P7.12 Matrix Inversion				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION OPERATION	INSTRUCTION ADDRESS	STOP	CONTENTS OF ADDRESS	NOTES
	'						
	'	☒					
		0100	B	0115	'		
		01	A	0022	'	3029	
		02	Y	0117	'		
		03	S	0025	'	☒ 3(n+1)	
		04	Y	0118	'		
		05	U	0113	'		
		06	XZ	0001	'		
		07	RC	J	'	☒	
		08	UC	J	'		
		09	BC	J	'		
		10	HC	J	'		
		11	XE	0000	'	☒	
		12	U	0143	'		
		13	RC	J	'		
		14	UC	J	'		
		15	SC	J	'	☒	
		16	MC	J	'		
		17	AC	J	'		
		18	CC	J	'		
		19	XE	0000	'	☒	
		20	U	0130	'		
		21	RC	J	'		
		22	UC	J	'		
		23	SC	J	'	☒	
		24	MC	J	'		
		25	CC	J	'		
		26	XE	0000	'		
		27	B	0115	'	☒	
		28	A	0024	'	3n0+9	
		29	U	0046	'		
		30	B	0116	'		
		31	A	0022	'	☒ 3029	

FORM LP-30

☒ CARRIAGE RETURN

ROYAL MCBEE J13641X

LGP-30 CODING SHEET

PREPARED FOR:

JOB NO.	PROGRAM NO.	PROGRAM PREPARED BY	PROGRAM CHECKED BY	DATE
0152		C. H		1-

PROBLEM: Q. P. F. P. [illegible]

PROGRAM INPUT CODES	STOP	LOCATION	OPERATION / ADDRESS	STOP	CONTENTS OF ADDRESS	NOTES
	'					
	'	☒				
		0132	Y0116 '			
		33	S0124 '			
		34	T0139 '			
		35	B0115 '	☒		
		36	S0022 '		3@29	
		37	Y0125 '			
		38	U0121 '			
		39	B0117 '	☒		
		40	U0101 '			
		41	H0163 '			
		42	U0161 '			
		43	B0022 '	☒	3@29	
		44	A0109 '			
		45	U0051 '			
		46	A0022 '		3@29	
		47	Y0019 '	☒		
		48	Y0020 '			
		49	A0021 '			
		50	Y0155 '			
		51	Y0036 '	☒		
		52	U0031 '			
		5	RC J '			
		5	UC J '			
		5	BC J '	☒		
		56	MC J '			
		57	CC J '			
			YE0000 '			
			BC 6 '	☒		
		60	U0039 '			
		61	A0035 '		Mo	
			U0146 '			
			'	☒	$3n^2-1$	
		63				

FORM LP-12

☒ CARRIAGE RETURN

LGP-30 CODING SHEET

PREPARED FOR

PAGE 5 OF 5

JOB NO. 3152 | PROGRAM NO. | PROGRAM PREPARED BY C. H. | PROGRAM CHECKED BY | DATE 1-26-60

PROBLEM D. P. F. P. Matrix inversion

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	OPERATION	ADDRESS	STOP	CONTENTS OF ADDRESS	NOTES
	'						
	'	☒					
		0200		M0210	'	1@2	
		01		H0024	'	3n @29	
		02		S0022	'	3@29	
		03		H0021	'	☒ cl	
		04		A0023	'	6@29	
		05		H0025	'	3(n+1) @29	
		06		D0061	'	3@15	
		07		N0021	'	☒ 3(n-1) @29	
		08		M0213	'	1@17	
		09		U0141	'		
000004	'	10	2000	0000	'	}	
		11			'	☒ 1	
		12		8	'	}	
		13		4000	'	1@17	
		14			'		
		15			'	☒	
		16			'		
		17			'		
		18			'		
		19			'	☒	
		20			'		
		21			'		
		22			'		
		23			'	☒	
		24			'		
		25			'		
		26			'		
		27			'	☒	
		28			'		
		29			'		
		30			'		
		31			'	☒	

☒ CARRIAGE RETURN

' CONDITIONAL STOP CODE