APPENDIX A

Numerical considerations

2's complement	Decimal value	Excess-3
101	–3	000
110	–2	001
111	–1	010
000	0	011
001	1	100
010	2	101
011	3	110
100	Reserved pattern	111

FIGURE A.1

Excess-3 encoding, sorted by excess-3 ordering.

000	0
001	1
010	2
011	3
100	4
101	5
110	6
111	7

FIGURE A.2

Representable numbers of a 3-bit unsigned integer format.

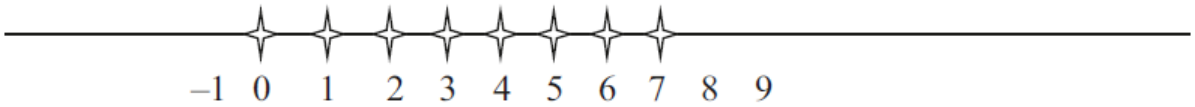

FIGURE A.3

Representable numbers of a 3-bit unsigned integer format.

		No-zero		Abrupt underflow		Denormalized	
E	M	S=0	S=1	S=0	S=1	S=0	S=1
00	00	2^{-1}	$-(2^{-1})$	0	0	0	0
	01	$2^{-1}+1*2^{-3}$	$-(2^{-1}+1*2^{-3})$	0	0	$1*2^{-2}$	$-1*2^{-2}$
	10	$2^{-1}+2*2^{-3}$	$-(2^{-1}+2*2^{-3})$	0	0	$2*2^{-2}$	$-2*2^{-2}$
	11	$2^{-1}+3*2^{-3}$	$-(2^{-1}+3*2^{-3})$	0	0	$3*2^{-2}$	$-3*2^{-2}$
01	00	2^{0}	$-(2^{0})$	2^{0}	$-(2^{0})$	2^{0}	$-(2^{0})$
	01	$2^{0}+1*2^{-2}$	$-(2^{0}+1*2^{-2})$	$2^{0}+1*2^{-2}$	$-(2^{0}+1*2^{-2})$	$2^{0}+1*2^{-2}$	$-(2^{0}+1*2^{-2})$
	10	$2^{0}+2*2^{-2}$	$-(2^{0}+2*2^{-2})$	$2^{0}+2*2^{-2}$	$-(2^{0}+2*2^{-2})$	$2^{0}+2*2^{-2}$	$-(2^{0}+2*2^{-2})$
	11	$2^{0}+3*2^{-2}$	$-(2^{0}+3*2^{-2})$	$2^{0}+3*2^{-2}$	$-(2^{0}+3*2^{-2})$	$2^{0}+3*2^{-2}$	$-(2^{0}+3*2^{-2})$
10	00	2^{1}	$-(2^{1})$	2^{1}	$-(2^{1})$	2^{1}	$-(2^{1})$
	01	$2^{1}+1*2^{-1}$	$-(2^{1}+1*2^{-1})$	$2^{1}+1*2^{-1}$	$-(2^{1}+1*2^{-1})$	$2^{1}+1*2^{-1}$	$-(2^{1}+1*2^{-1})$
	10	$2^{1}+2*2^{-1}$	$-(2^{1}+2*2^{-1})$	$2^{1}+2*2^{-1}$	$-(2^{1}+2*2^{-1})$	$2^{1}+2*2^{-1}$	$-(2^{1}+2*2^{-1})$
	11	$2^{1}+3*2^{-1}$	$-(2^{1}+3*2^{-1})$	$2^{1}+3*2^{-1}$	$-(2^{1}+3*2^{-1})$	$2^{1}+3*2^{-1}$	$-(2^{1}+3*2^{-1})$
11	Reserved pattern						

FIGURE A.4

Representable numbers of no-zero, abrupt underflow, and denormalized formats.

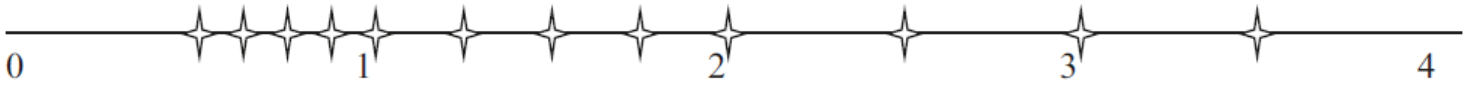

FIGURE A.5

Representable numbers of the no-zero representation.

FIGURE A.6

Representable numbers of the abrupt underflow format.

FIGURE A.7

Representable numbers of a denormalization format.

exponent	mantissa	meaning
11…1	$\neq 0$	NaN
11…1	=0	$(-1)^S * \infty$
00…0	≠0	denormalized
00…0	=0	0

FIGURE A.8

Special bit patterns in the IEEE standard format.

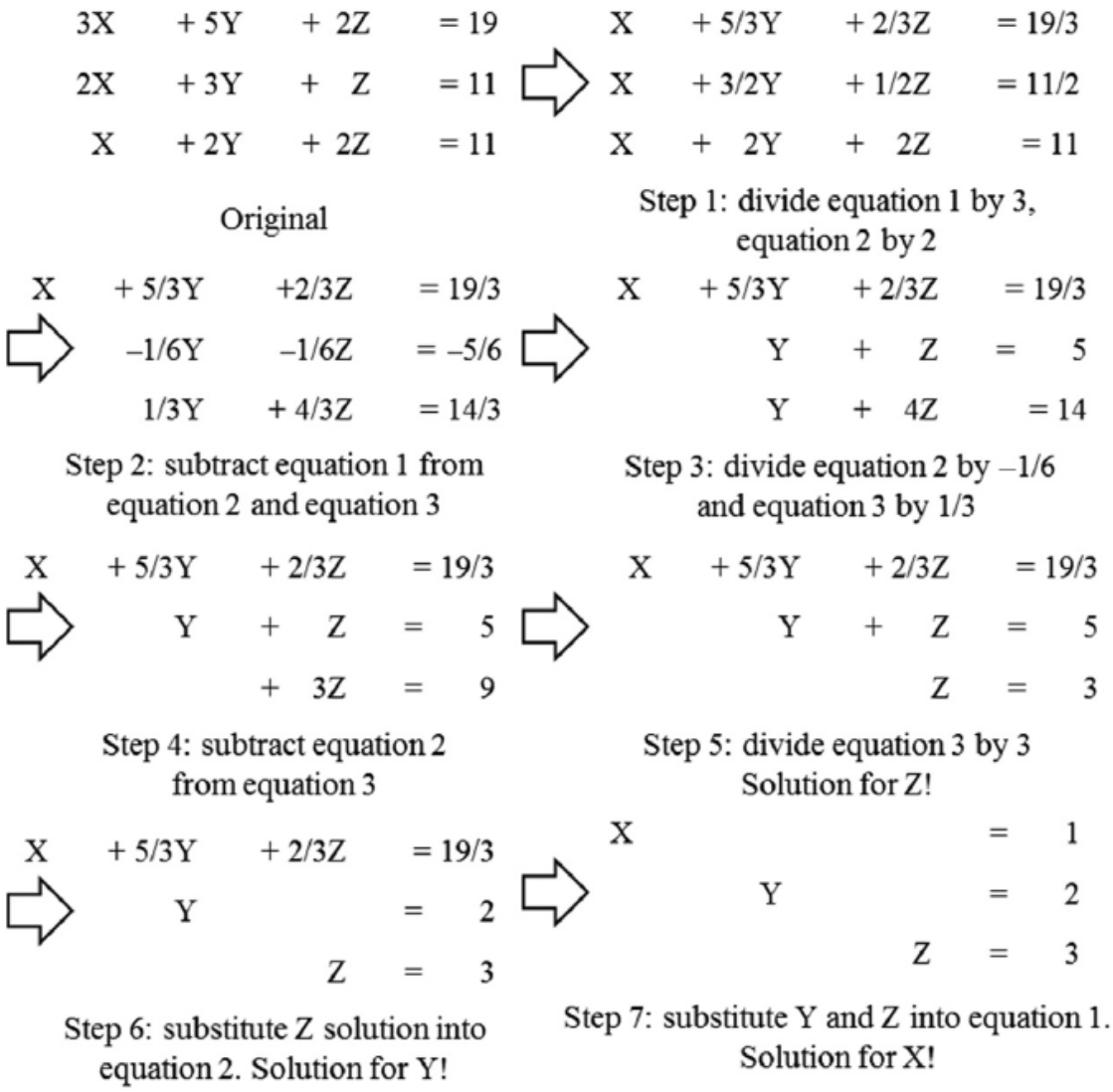

FIGURE A.9

Gaussian elimination and backward substitution for solving systems of linear equations.

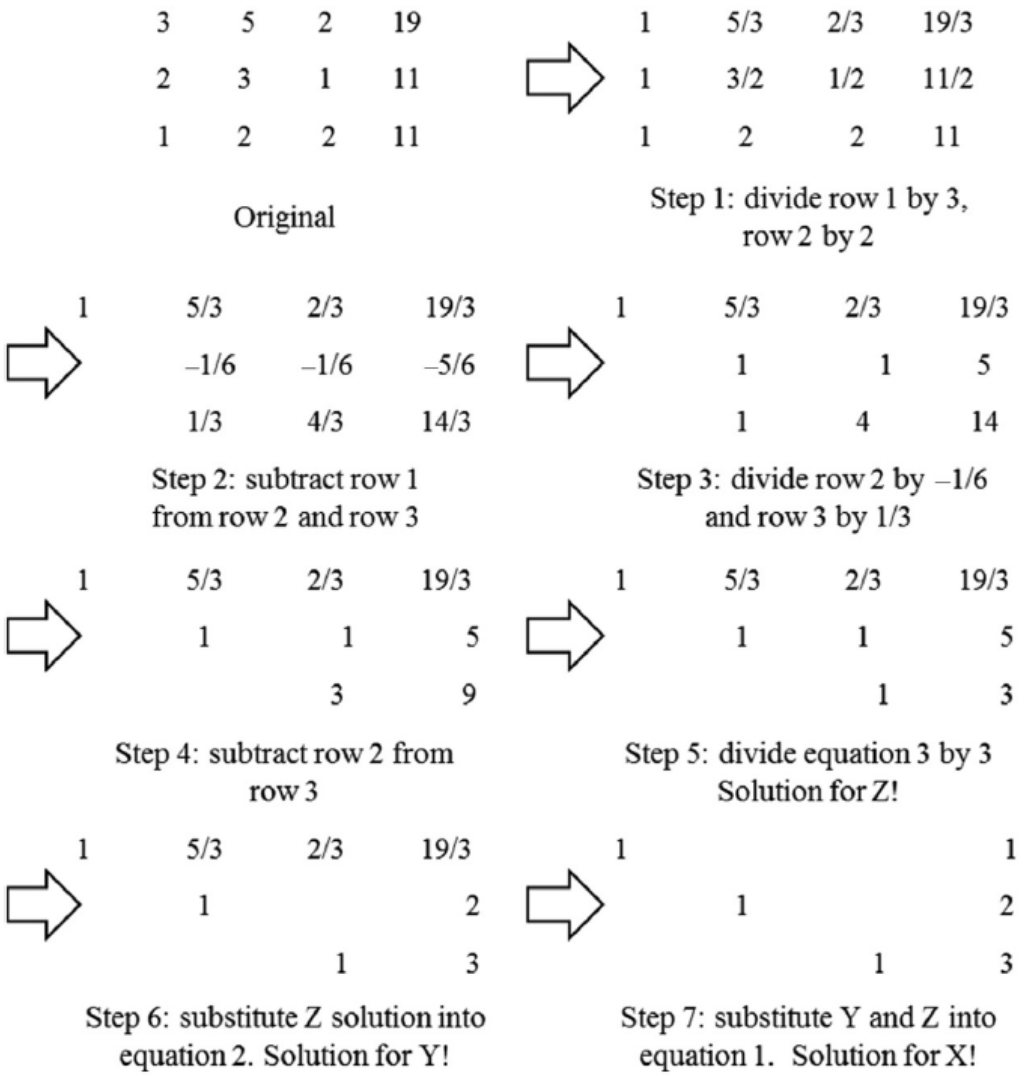

FIGURE A.10

Gaussian elimination and backward substitution in matrix view.

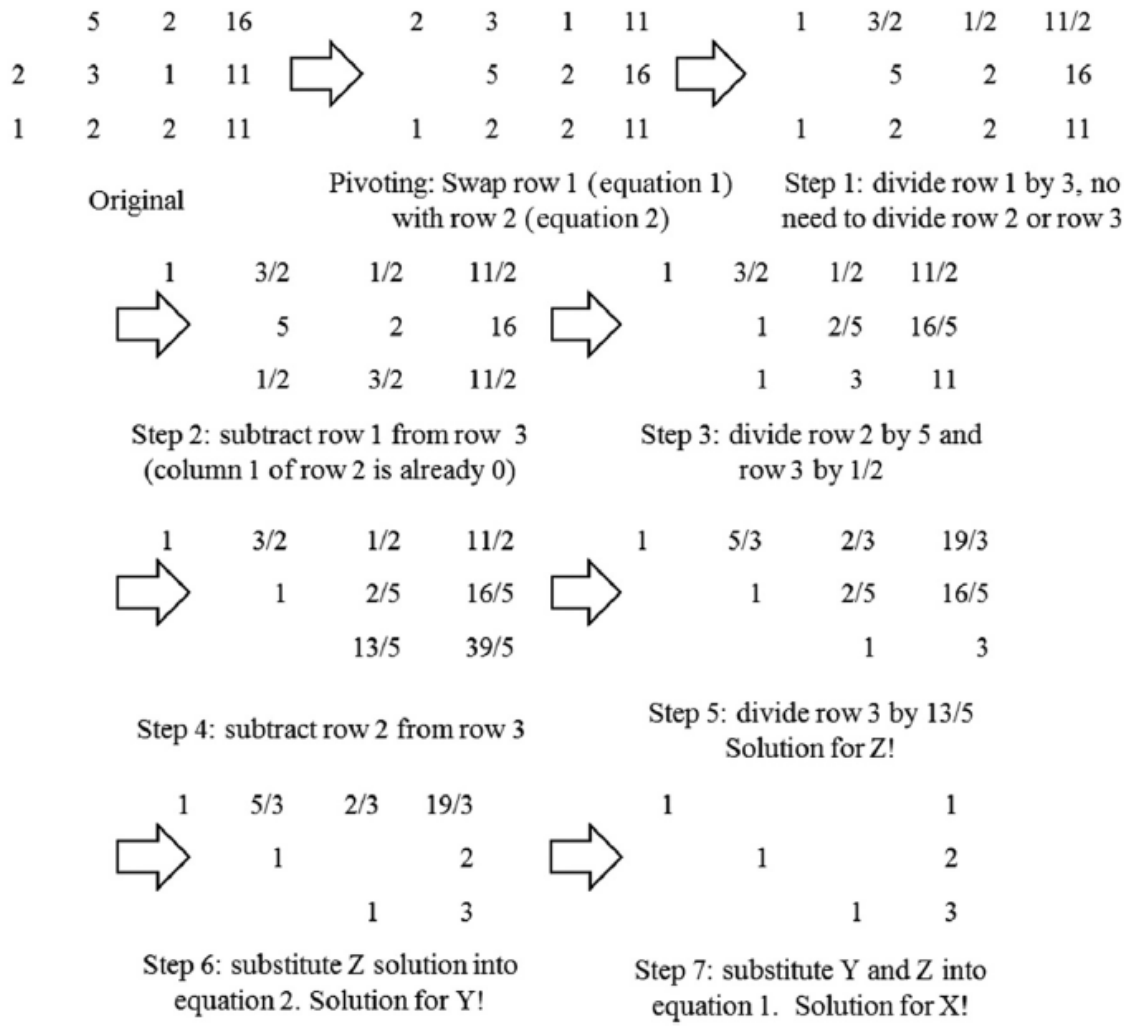

FIGURE A.11

Gaussian elimination with pivoting.