

References

The references collected here are those of general usefulness, usually cited in more than one section of this book. More specialized sources, usually cited in a single section, are not repeated here.

We first list a small number of books that form the nucleus of a recommended personal reference collection on numerical methods, numerical analysis, and closely related subjects. These are the books that we like to have within easy reach.

- Abramowitz, M., and Stegun, I.A. 1964, *Handbook of Mathematical Functions*, Applied Mathematics Series, Volume 55 (Washington: National Bureau of Standards; reprinted 1968 by Dover Publications, New York)
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- Stoer, J., and Bulirsch, R. 1980, *Introduction to Numerical Analysis* (New York: Springer-Verlag)
- Wilkinson, J.H., and Reinsch, C. 1971, *Linear Algebra*, vol. II of *Handbook for Automatic Computation* (New York: Springer-Verlag)

We next list the larger collection of books, which, in our view, should be included in any serious research library on computing, numerical methods, or analysis.

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Index of Programs and Dependencies

The following table lists, in alphabetical order, all the routines in *Numerical Recipes*. When a routine requires subsidiary routines, either from this book or else user-supplied, the full dependency tree is shown: A routine calls directly all routines to which it is connected by a solid line in the column immediately to its right; it calls indirectly the connected routines in all columns to its right. Typographical conventions: Routines from this book are in typewriter font (e.g., `eu1sum`, `gammln`). The smaller, slanted font is used for the second and subsequent occurrences of a routine in a single dependency tree. (When you are getting routines from the *Numerical Recipes* diskettes, or their archive files, you need only specify names in the larger, upright font.) User-supplied routines are indicated by the use of text font and square brackets, e.g., `[funcv]`. Consult the text for individual specifications of these routines. The right-hand side of the table lists section and page numbers for each program.

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miser ── ranpt ── ran1	§7.8 (p. 316)	
└─ [func]		
mmid ── [derivs]	§16.3 (p. 717)	
mnbrak ── [func]	§10.1 (p. 393)	
mnewt ── [usrfun]	§9.6 (p. 374)	
└─ ludcmp		
└─ lubksb		
moment	§14.1 (p. 607)	
mp2dfr ── mpops	§20.6 (p. 913)	
mpdiv ── mpinv ── mpmul ── drealft ── dfour1	§20.6 (p. 911)	
└─ mpops		
└─ mpmul ── drealft ── dfour1		
└─ mpops		
mpinv ── mpmul ── drealft ── dfour1	§20.6 (p. 911)	
└─ mpops		
mpmul ── drealft ── dfour1	§20.6 (p. 910)	
mpops	§20.6 (p. 907)	
mppi ── mpsqrt ── mpmul ── drealft ── dfour1	§20.6 (p. 913)	
└─ mpops		
└─ mpops		
└─ mpmul ── drealft ── dfour1		
└─ mpinv ── mpmul ── drealft ── dfour1		
└─ mp2dfr ── mpops		
mprove ── lubksb	§2.5 (p. 48)	
mpsqrt ── mpmul ── drealft ── dfour1	§20.6 (p. 912)	
└─ mpops		
mrqcof ── [funcs]	§15.5 (p. 681)	
mrqmin ── mrqcof	§15.5 (p. 680)	
└─ gaussj		
└─ covsrt		

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newt	└─ fmin	└─ [funcv]	§9.7 (p. 379)
	└─ fdjac	└─ [funcv]	
	└─ ludcmp		
	└─ lubksb		
	└─ lnsrch	└─ <i>fmin</i>	└─ [funcv]
odeint	└─ [derivs]		§16.2 (p. 714)
	└─ rkqs	└─ [derivs]	
		└─ rkck	└─ [derivs]
orthog			§4.5 (p. 153)
pade	└─ ludcmp		§5.12 (p. 196)
	└─ lubksb		
	└─ mprove	└─ <i>lubksb</i>	
pccheb			§5.11 (p. 193)
pcshft			§5.10 (p. 192)
pearsn	└─ betai	└─ gammln	§14.5 (p. 632)
		└─ betacf	
period	└─ avevar		§13.8 (p. 572)
piksr2			§8.1 (p. 322)
piksr4			§8.1 (p. 321)
pinvs			§17.3 (p. 762)
plgndr			§6.8 (p. 247)
poidev	└─ ran1		§7.3 (p. 284)
	└─ gammln		
polcoe			§3.5 (p. 114)
polcof	└─ polint		§3.5 (p. 115)
poldiv			§5.3 (p. 169)
polin2	└─ polint		§3.6 (p. 118)
polint			§3.1 (p. 103)
powell	└─ [func]		§10.5 (p. 411)
	└─ linmin	└─ mnbrak	
		└─ brent	└─ f1dim
			└─ [func]
predic			§13.6 (p. 562)
probks			§14.3 (p. 620)
psdes			§7.5 (p. 293)
pwt			§13.10 (p. 589)
pwtset			§13.10 (p. 589)
pythag			§2.6 (p. 62)
pzextr			§16.4 (p. 724)
qgaus	└─ [func]		§4.5 (p. 141)
qrdcmp			§2.10 (p. 92)

qromb	└─ trapzd — [func]	. . . . .	§4.3 (p. 134)
	└─ polint		
qromo	└─ midpnt — [func]	. . . . .	§4.4 (p. 137)
	└─ polint		
qroot	— poldiv	. . . . .	§9.5 (p. 371)
qrsolv	— rsolv	. . . . .	§2.10 (p. 93)
qrupdt	— rotate	. . . . .	§2.10 (p. 94)
qsimp	— trapzd — [func]	. . . . .	§4.2 (p. 133)
qtrap	— trapzd — [func]	. . . . .	§4.2 (p. 131)
quad3d	— qgaus	└─ [func]	§4.6 (p. 157)
		└─ [y1]	
		└─ [y2]	
		└─ [z1]	
		└─ [z2]	
quadct		. . . . .	§14.7 (p. 642)
quadmx	— wrights — kermom	. . . . .	§18.3 (p. 793)
quadvl		. . . . .	§14.7 (p. 643)
ran0		. . . . .	§7.1 (p. 270)
ran1		. . . . .	§7.1 (p. 271)
ran2		. . . . .	§7.1 (p. 272)
ran3		. . . . .	§7.1 (p. 273)
ran4	— psdes	. . . . .	§7.5 (p. 294)
rank		. . . . .	§8.4 (p. 333)
ranpt	— ran1	. . . . .	§7.8 (p. 318)
ratint		. . . . .	§3.2 (p. 106)
ratlsq	└─ [fn]	. . . . .	§5.13 (p. 200)
	└─ dsvdcmp — dpythag		
	└─ dsvbksb		
	└─ ratval		
ratval		. . . . .	§5.3 (p. 170)
rc		. . . . .	§6.11 (p. 259)
rd		. . . . .	§6.11 (p. 257)
realft	— four1	. . . . .	§12.3 (p. 507)
rebin		. . . . .	§7.8 (p. 314)
red		. . . . .	§17.3 (p. 763)
relax		. . . . .	§19.6 (p. 872)
relax2		. . . . .	§19.6 (p. 878)
resid		. . . . .	§19.6 (p. 872)
revcst		. . . . .	§10.9 (p. 441)
revers		. . . . .	§10.9 (p. 442)
rf		. . . . .	§6.11 (p. 257)

<ul style="list-style-type: none"> <ul style="list-style-type: none"> rc rf 	§6.11 (p. 258)
rk4 — [derivs]	§16.1 (p. 706)
rkck — [derivs]	§16.2 (p. 713)
<ul style="list-style-type: none"> <ul style="list-style-type: none"> [derivs] <ul style="list-style-type: none"> rk4 — [derivs] 	§16.1 (p. 707)
rkqs — rkck — [derivs]	§16.2 (p. 712)
rlft3 — fourn	§12.5 (p. 522)
rofunc — select	§15.7 (p. 700)
rotate	§2.10 (p. 95)
rsolv	§2.10 (p. 93)
rstrct	§19.6 (p. 870)
rtbis — [func]	§9.1 (p. 347)
rtflsp — [func]	§9.2 (p. 349)
rtnewt — [funcd]	§9.4 (p. 358)
rtsafe — [funcd]	§9.4 (p. 359)
rtsec — [func]	§9.2 (p. 350)
rzextr	§16.4 (p. 725)
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ludcmp lubksb 	§14.8 (p. 646)
scrsho — [func]	§9.0 (p. 342)
select	§8.5 (p. 334)
selip — shell	§8.5 (p. 335)
<ul style="list-style-type: none"> <ul style="list-style-type: none"> plgnr <ul style="list-style-type: none"> solvde — <ul style="list-style-type: none"> difeq pinvs red bksub 	§17.4 (p. 768)
shell	§8.1 (p. 323)
<ul style="list-style-type: none"> <ul style="list-style-type: none"> [load] <ul style="list-style-type: none"> odeint — [derivs] <ul style="list-style-type: none"> rkqs — rkck — [derivs] [score] 	§17.1 (p. 750)
<ul style="list-style-type: none"> <ul style="list-style-type: none"> [load1] <ul style="list-style-type: none"> odeint — [derivs] <ul style="list-style-type: none"> rkqs — rkck — [derivs] [score] [load2] 	§17.2 (p. 752)
simpl	§10.8 (p. 434)
simp2	§10.8 (p. 434)
simp3	§10.8 (p. 435)

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	├─ simp2	
	└─ simp3	
simpr	├─ ludcmp	§16.6 (p. 736)
	├─ lubksb	
	└─ [derivs]	
sinft	├─ realft ── four1	§12.3 (p. 511)
slvsm2	├─ fill0	§19.6 (p. 878)
slvsm1	├─ fill0	§19.6 (p. 872)
sncndn	§6.11 (p. 262)
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sobseq	§7.7 (p. 302)
solvde	├─ difeq	§17.3 (p. 760)
	├─ pinvs	
	├─ red	
	└─ bksub	
sor	§19.5 (p. 860)
sort	§8.2 (p. 324)
sort2	. . . . .	§8.2 (p. 326)
sort3	├─ indext	§8.4 (p. 332)
spctrm	├─ four1	§13.4 (p. 550)
spear	├─ sort2	§14.6 (p. 635)
	├─ crank	
	├─ erfcc	
	└─ betai ── gammln	
	└─ betacf	
sphbes	├─ bessjy ── beschb ── chebev	§6.7 (p. 245)
sphfpt	├─ newt ── fdjac ── shootf (q.v.)	§17.4 (p. 772)
	├─ lnsrch ──	
	├─ fmin ── shootf (q.v.)	
	├─ ludcmp	
	└─ lubksb	
sphoot	├─ newt ── fdjac ── shoot (q.v.)	§17.4 (p. 771)
	├─ lnsrch ──	
	├─ fmin ── shoot (q.v.)	
	├─ ludcmp	
	└─ lubksb	
splie2	├─ spline	§3.6 (p. 121)
splin2	├─ splint	§3.6 (p. 121)
	└─ spline	
spline	§3.3 (p. 109)
splint	§3.3 (p. 110)
spread	§13.8 (p. 576)

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sprsin	§2.7 (p. 72)
sprspm	§2.7 (p. 75)
sprstm	§2.7 (p. 76)
sprstp	— iindexx	§2.7 (p. 73)
sprstx	§2.7 (p. 73)
stifbs	├── jacobn	§16.6 (p. 737)
	│ ├── simpr ───┬── ludcmp	
	│ │ └── lubksb	
	│ └── pzextr	
stiff	├── jacobn	§16.6 (p. 732)
	│ ├── ludcmp	
	│ ├── lubksb	
	│ └── [derivs]	
stoerm	— [derivs]	§16.5 (p. 726)
svbksb	§2.6 (p. 56)
svdcmp	— pythag	§2.6 (p. 59)
svdfit	├── [funcs]	§15.4 (p. 672)
	│ ├── svdcmp ───┬── pythag	
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tptest	├── avevar	§14.2 (p. 612)
	│ └── betai ───┬── gammln	
	│ │ └── betacf	
tqli	— pythag	§11.3 (p. 473)
trapzd	— [func]	§4.2 (p. 131)
tred2	. . . . .	§11.2 (p. 467)
tridag	. . . . .	§2.4 (p. 43)
trncst	. . . . .	§10.9 (p. 442)
trnspt	. . . . .	§10.9 (p. 442)
ttest	├── avevar	§14.2 (p. 610)
	│ └── betai ───┬── gammln	
	│ │ └── betacf	
tutest	├── avevar	§14.2 (p. 611)
	│ └── betai ───┬── gammln	
	│ │ └── betacf	
twofft	— four1	§12.3 (p. 505)
vander	. . . . .	§2.8 (p. 84)
vegas	├── rebin	§7.8 (p. 311)
	│ ├── ran2	
	│ └── [fxn]	

voltra	└─ [g]	. . . . .	§18.2 (p. 787)
	└─ [ak]		
	└─ ludcmp		
	└─ lubksb		
wt1	— daub4	. . . . .	§13.10 (p. 587)
wtn	— daub4	. . . . .	§13.10 (p. 595)
wghts	— kermom	. . . . .	§18.3 (p. 791)
zbrac	— [func]	§9.1 (p. 345)
zbrak	— [func]	§9.1 (p. 345)
zbrent	— [func]	§9.3 (p. 354)
zrhqr	└─ balanc	§9.5 (p. 368)
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zridr	— [func]	§9.2 (p. 351)
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