

# NUMERICAL RECIPES

## Webnote No. 7, Rev. 1

### Coefficients Used in the Bessjy and Bessik Objects

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const Doub Bessjy::xj00=5.783185962946785;
const Doub Bessjy::xj10=3.047126234366209e1;
First two zeros of  $J_0$ ,  $2/\pi$  and  $\pi/4$ .
const Doub Bessjy::xj01=1.468197064212389e1;
const Doub Bessjy::xj11=4.921845632169460e1;
First two zeros of  $J_1$ ,  $2/\pi$  and  $\pi/4$ .
const Doub Bessjy::twoopi=0.6366197723675813;
const Doub Bessjy::pio4=0.7853981633974483;
const Doub Bessjy::j0r[]={1.682397144220462e-4,2.058861258868952e-5,
5.288947320067750e-7,5.557173907680151e-9,2.865540042042604e-11,
7.398972674152181e-14,7.925088479679688e-17};
const Doub Bessjy::j0s[]={1.0,1.019685405805929e-2,5.130296867064666e-5,
1.659702063950243e-7,3.728997574317067e-10,
5.709292619977798e-13,4.932979170744996e-16};
const Doub Bessjy::j0pn[]={9.99999999999999e-1,1.039698629715637,
2.576910172633398e-1,1.504152485749669e-2,1.052598413585270e-4};
const Doub Bessjy::j0pd[]={1.0,1.040797262528109,2.588070904043728e-1,
1.529954477721284e-2,1.168931211650012e-4};
const Doub Bessjy::j0qn[]={-1.562499999999992e-2,-1.920039317065641e-2,
-5.827951791963418e-3,-4.372674978482726e-4,-3.895839560412374e-6};
const Doub Bessjy::j0qd[]={1.0,1.237980436358390,3.838793938147116e-1,
3.100323481550864e-2,4.165515825072393e-4};
const Doub Bessjy::j1r[]={7.309637831891357e-5,3.551248884746503e-6,
5.820673901730427e-8,4.500650342170622e-10,1.831596352149641e-12,
3.891583573305035e-15,3.524978592527982e-18};
const Doub Bessjy::j1s[]={1.0,9.398354768446072e-3,4.328946737100230e-5,
1.271526296341915e-7,2.566305357932989e-10,
3.477378203574266e-13,2.593535427519985e-16};
const Doub Bessjy::j1pn[]={1.0,1.014039111045313,2.426762348629863e-1,
1.350308200342000e-2,9.516522033988099e-5};
const Doub Bessjy::j1pd[]={1.0,1.012208056357845,2.408580305488938e-1,
1.309511056184273e-2,7.746422941504713e-5};
const Doub Bessjy::j1qn[]={4.687499999999991e-2,5.652407388406023e-2,
1.676531273460512e-2,1.231216817715814e-3,1.178364381441801e-5};
const Doub Bessjy::j1qd[]={1.0,1.210119370463693,3.626494789275638e-1,
2.761695824829316e-2,3.240517192670181e-4};
const Doub Bessjy::y0r[]={-7.653778457189104e-3,-5.854760129990403e-2,
3.720671300654721e-4,3.313722284628089e-5,4.247761237036536e-8,
-4.134562661019613e-9,-3.382190331837473e-11,
-1.017764126587862e-13,-1.107646382675456e-16};
const Doub Bessjy::y0s[]={1.0,1.125494540257841e-2,6.427210537081400e-5,
2.462520624294959e-7,7.029372432344291e-10,1.560784108184928e-12,
2.702374957564761e-15,3.468496737915257e-18,2.716600180811817e-21};
const Doub Bessjy::y0pn[]={9.99999999999999e-1,1.039698629715637,
2.576910172633398e-1,1.504152485749669e-2,1.052598413585270e-4};
const Doub Bessjy::y0pd[]={1.0,1.040797262528109,2.588070904043728e-1,
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1.529954477721284e-2,1.168931211650012e-4};
const Doub Bessjy::y0qn[]={-1.5624999999999992e-2,-1.920039317065641e-2,
-5.827951791963418e-3,-4.372674978482726e-4,-3.895839560412374e-6};
const Doub Bessjy::y0qd[]={1.0,1.237980436358390,3.838793938147116e-1,
3.100323481550864e-2,4.165515825072393e-4};
const Doub Bessjy::y1r[]={-1.041835425863234e-1,-1.135093963908952e-5,
2.212118520638132e-4,1.270981874287763e-6,
-3.982892100836748e-8,-4.820712110115943e-10,
-1.929392690596969e-12,-2.725259514545605e-15};
const Doub Bessjy::y1s[]={1.0,1.186694184425838e-2,7.121205411175519e-5,
2.847142454085055e-7,8.364240962784899e-10,1.858128283833724e-12,
3.018846060781846e-15,3.015798735815980e-18};
const Doub Bessjy::y1pn[]={1.0,1.014039111045313,2.426762348629863e-1,
1.350308200342000e-2,9.516522033988099e-5};
const Doub Bessjy::y1pd[]={1.0,1.012208056357845,2.408580305488938e-1,
1.309511056184273e-2,7.746422941504713e-5};
const Doub Bessjy::y1qn[]={4.6874999999999991e-2,5.652407388406023e-2,
1.676531273460512e-2,1.231216817715814e-3,1.178364381441801e-5};
const Doub Bessjy::y1qd[]={1.0,1.210119370463693,3.626494789275638e-1,
2.761695824829316e-2,3.240517192670181e-4};

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const Doub Bessik::i0p[]={9.999999999999997e-1,2.466405579426905e-1,
1.478980363444585e-2,3.826993559940360e-4,5.395676869878828e-6,
4.700912200921704e-8,2.733894920915608e-10,1.115830108455192e-12,
3.301093025084127e-15,7.209167098020555e-18,1.166898488777214e-20,
1.378948246502109e-23,1.124884061857506e-26,5.498556929587117e-30};
const Doub Bessik::i0q[]={4.463598170691436e-1,1.702205745042606e-3,
2.792125684538934e-6,2.369902034785866e-9,8.965900179621208e-13};
const Doub Bessik::i0pp[]={1.192273748120670e-1,1.947452015979746e-1,
7.629241821600588e-2,8.474903580801549e-3,2.023821945835647e-4};
const Doub Bessik::i0qq[]={2.962898424533095e-1,4.866115913196384e-1,
1.938352806477617e-1,2.261671093400046e-2,6.450448095075585e-4,
1.529835782400450e-6};
const Doub Bessik::i1p[]={5.000000000000000e-1,6.090824836578078e-2,
2.407288574545340e-3,4.622311145544158e-5,5.161743818147913e-7,
3.712362374847555e-9,1.833983433811517e-11,6.493125133990706e-14,
1.693074927497696e-16,3.299609473102338e-19,4.813071975603122e-22,
5.164275442089090e-25,3.846870021788629e-28,1.712948291408736e-31};
const Doub Bessik::i1q[]={4.665973211630446e-1,1.677754477613006e-3,
2.583049634689725e-6,2.045930934253556e-9,7.166133240195285e-13};
const Doub Bessik::i1pp[]={1.286515211317124e-1,1.930915272916783e-1,
6.965689298161343e-2,7.345978783504595e-3,1.963602129240502e-4};
const Doub Bessik::i1qq[]={3.309385098860755e-1,4.878218424097628e-1,
1.663088501568696e-1,1.473541892809522e-2,1.964131438571051e-4,
-1.034524660214173e-6};
const Doub Bessik::k0pi[]={1.0,2.346487949187396e-1,1.187082088663404e-2,
2.150707366040937e-4,1.425433617130587e-6};
const Doub Bessik::k0qi[]={9.847324170755358e-1,1.518396076767770e-2,
8.362215678646257e-5};
const Doub Bessik::k0p[]={1.159315156584126e-1,2.770731240515333e-1,
2.066458134619875e-2,4.574734709978264e-4,3.454715527986737e-6};
const Doub Bessik::k0q[]={9.836249671709183e-1,1.627693622304549e-2,
9.809660603621949e-5};
const Doub Bessik::k0pp[]={1.253314137315499,1.475731032429900e1,
6.123767403223466e1,1.121012633939949e2,9.285288485892228e1,
3.198289277679660e1,3.595376024148513,6.160228690102976e-2};
const Doub Bessik::k0qq[]={1.0,1.189963006673403e1,5.027773590829784e1,
9.496513373427093e1,8.318077493230258e1,3.181399777449301e1,
4.443672926432041,1.408295601966600e-1};
const Doub Bessik::k1pi[]={0.5,5.598072040178741e-2,1.818666382168295e-3,
2.397509908859959e-5,1.239567816344855e-7};
const Doub Bessik::k1qi[]={9.870202601341150e-1,1.292092053534579e-2,

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5.881933053917096e-5};
const Doub Bessik::kip[]={-3.079657578292062e-1,-8.109417631822442e-2,
-3.477550948593604e-3,-5.385594871975406e-5,-3.110372465429008e-7};
const Doub Bessik::k1q[]={9.861813171751389e-1,1.375094061153160e-2,
6.774221332947002e-5};
const Doub Bessik::k1pp[]={1.253314137315502,1.457171340220454e1,
6.063161173098803e1,1.147386690867892e2,1.040442011439181e2,
4.356596656837691e1,7.265230396353690,3.144418558991021e-1};
const Doub Bessik::k1qq[]={1.0,1.125154514806458e1,4.427488496597630e1,
7.616113213117645e1,5.863377227890893e1,1.850303673841586e1,
1.857244676566022,2.538540887654872e-2};
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