NAG Library Chapter Contents

D03 – Partial Differential Equations

D03 Chapter Introduction

Routine Name	Mark of Introduction	Purpose
D03EAF	7	nagf_pde_2d_laplace Elliptic PDE, Laplace's equation, two-dimensional arbitrary domain
D03EBF	7	nagf_pde_2d_ellip_fd Elliptic PDE, solution of finite difference equations by SIP, five-point two-dimensional molecule, iterate to convergence
D03ECF	8	nagf_pde_3d_ellip_fd Elliptic PDE, solution of finite difference equations by SIP for seven-point three-dimensional molecule, iterate to convergence
D03EDF	12	nagf_pde_2d_ellip_mgrid Elliptic PDE, solution of finite difference equations by a multigrid technique
D03EEF	13	nagf_pde_2d_ellip_discret Discretize a second-order elliptic PDE on a rectangle
D03FAF	14	nagf_pde_3d_ellip_helmholtz Elliptic PDE, Helmholtz equation, three-dimensional Cartesian coordinates
D03MAF	7	nagf_pde_2d_triangulate Triangulation of plane region
D03NCF	20	nagf_pde_1d_blackscholes_fd Finite difference solution of the Black–Scholes equations
D03NDF	20	nagf_pde_1d_blackscholes_closed Analytic solution of the Black–Scholes equations
D03NEF	20	nagf_pde_1d_blackscholes_means Compute average values for D03NDF
D03PCA	20	nagf_pde_1d_parab_fd General system of parabolic PDEs, method of lines, finite differences, one space variable
D03PCF	15	nagf_pde_1d_parab_fd_old General system of parabolic PDEs, method of lines, finite differences, one space variable
D03PDA	20	nagf_pde_1d_parab_coll General system of parabolic PDEs, method of lines, Chebyshev C^0 collocation, one space variable
D03PDF	15	nagf_pde_1d_parab_coll_old General system of parabolic PDEs, method of lines, Chebyshev C^0 collocation, one space variable
D03PEF	16	nagf_pde_1d_parab_keller General system of first-order PDEs, method of lines, Keller box discretization, one space variable
D03PFF	17	nagf_pde_1d_parab_convdiff General system of convection-diffusion PDEs with source terms in conservative form, method of lines, upwind scheme using numerical flux function based on Riemann solver, one space variable
D03PHA	20	nagf_pde_1d_parab_dae_fd General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, one space variable
D03PHF	15	nagf_pde_1d_parab_dae_fd_old General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, one space variable

D03PJA	20	nagf_pde_1d_parab_dae_coll General system of parabolic PDEs, coupled DAEs, method of lines, Chebyshev C^0 collocation, one space variable
D03PJF	15	nagf_pde_1d_parab_dae_coll_old General system of parabolic PDEs, coupled DAEs, method of lines, Chebyshev C^0 collocation, one space variable
D03PKF	16	nagf_pde_1d_parab_dae_keller General system of first-order PDEs, coupled DAEs, method of lines, Keller box discretization, one space variable
D03PLF	17	nagf_pde_1d_parab_convdiff_dae General system of convection-diffusion PDEs with source terms in conservative form, coupled DAEs, method of lines, upwind scheme using numerical flux function based on Riemann solver, one space variable
D03PPA	20	nagf_pde_1d_parab_remesh_fd General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, remeshing, one space variable
D03PPF	16	nagf_pde_1d_parab_remesh_fd_old General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, remeshing, one space variable
D03PRF	16	nagf_pde_1d_parab_remesh_keller General system of first-order PDEs, coupled DAEs, method of lines, Keller box discretization, remeshing, one space variable
D03PSF	17	nagf_pde_1d_parab_convdiff_remesh General system of convection-diffusion PDEs, coupled DAEs, method of lines, upwind scheme, remeshing, one space variable
D03PUF	17	nagf_pde_1d_parab_euler_roe Roe's approximate Riemann solver for Euler equations in conservative form, for use with D03PFF, D03PLF and D03PSF
D03PVF	17	nagf_pde_1d_parab_euler_osher Osher's approximate Riemann solver for Euler equations in conservative form, for use with D03PFF, D03PLF and D03PSF
D03PWF	18	nagf_pde_1d_parab_euler_hll Modified HLL Riemann solver for Euler equations in conservative form, for use with D03PFF, D03PLF and D03PSF
D03PXF	18	nagf_pde_1d_parab_euler_exact Exact Riemann solver for Euler equations in conservative form, for use with D03PFF, D03PLF and D03PSF
D03PYF	15	nagf_pde_1d_parab_coll_interp PDEs, spatial interpolation with D03PDF/D03PDA or D03PJF/D03PJA
D03PZF	15	nagf_pde_1d_parab_fd_interp PDEs, spatial interpolation with D03PCF/D03PCA, D03PEF, D03PFF, D03PHF/D03PHA, D03PKF, D03PLF, D03PPF/D03PPA, D03PRF or D03PSF
D03RAF	18	nagf_pde_2d_gen_order2_rectangle General system of second-order PDEs, method of lines, finite differences, remeshing, two space variables, rectangular region
D03RBF	18	nagf_pde_2d_gen_order2_rectilinear General system of second-order PDEs, method of lines, finite differences, remeshing, two space variables, rectilinear region
D03RYF	18	nagf_pde_2d_gen_order2_checkgrid Check initial grid data in D03RBF
D03RZF	18	nagf_pde_2d_gen_order2_rectilinear_extractgrid Extract grid data from D03RBF

D03UAF	7	nagf_pde_2d_ellip_fd_iter Elliptic PDE, solution of finite difference equations by SIP, five-point two-dimensional molecule, one iteration
D03UBF	8	nagf_pde_3d_ellip_fd_iter Elliptic PDE, solution of finite difference equations by SIP, seven-point three-dimensional molecule, one iteration