# NAG Library Chapter Contents

# d03 – Partial Differential Equations

d03 Chapter Introduction


| Function Name | Mark of Introduction | Purpose |
|---|---|---|
| d03ncc | 7 | nag_pde_bs_1d<br>Finite difference solution of the Black–Scholes equations |
| d03ndc | 7 | nag_pde_bs_1d_analytic<br>Analytic solution of the Black–Scholes equations |
| d03nec | 7 | nag_pde_bs_1d_means<br>Compute average values for nag_pde_bs_1d_analytic (d03ndc) |
| d03pcc | 7 | nag_pde_parab_1d_fd<br>General system of parabolic PDEs, method of lines, finite differences, one space variable |
| d03pdc | 7 | nag_pde_parab_1d_coll<br>General system of parabolic PDEs, method of lines, Chebyshev $C^0$ collocation, one space variable |
| d03pec | 7 | nag_pde_parab_1d_keller<br>General system of first-order PDEs, method of lines, Keller box discretization, one space variable |
| d03pfc | 7 | nag_pde_parab_1d_cd<br>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 |
| d03phc | 7 | nag_pde_parab_1d_fd_ode<br>General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, one space variable |
| d03pjc | 7 | nag_pde_parab_1d_coll_ode<br>General system of parabolic PDEs, coupled DAEs, method of lines, Chebyshev $C^0$ collocation, one space variable |
| d03pkc | 7 | nag_pde_parab_1d_keller_ode<br>General system of first-order PDEs, coupled DAEs, method of lines, Keller box discretization, one space variable |
| d03plc | 7 | nag_pde_parab_1d_cd_ode<br>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 |
| d03ppc | 7 | nag_pde_parab_1d_fd_ode_remesh<br>General system of parabolic PDEs, coupled DAEs, method of lines, finite differences, remeshing, one space variable |
| d03prc | 7 | nag_pde_parab_1d_keller_ode_remesh<br>General system of first-order PDEs, coupled DAEs, method of lines, Keller box discretization, remeshing, one space variable |
| d03psc | 7 | nag_pde_parab_1d_cd_ode_remesh<br>General system of convection-diffusion PDEs, coupled DAEs, method of lines, upwind scheme, remeshing, one space variable |
| d03puc | 7 | nag_pde_parab_1d_euler_roe<br>Roe's approximate Riemann solver for Euler equations in conservative form, for use with nag_pde_parab_1d_cd (d03pfc), nag_pde_parab_1d_cd_ode (d03plc) and nag_pde_parab_1d_cd_ode_remesh (d03psc) |

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|---|---|---|
| d03pvc | 7 | nag_pde_parab_1d_euler_osher<br>Osher's approximate Riemann solver for Euler equations in conservative form, for use with nag_pde_parab_1d_cd (d03pfc), nag_pde_parab_1d_cd_ode (d03plc) and nag_pde_parab_1d_cd_ode_remesh (d03psc) |
| d03pwc | 7 | nag_pde_parab_1d_euler_hll<br>Modified HLL Riemann solver for Euler equations in conservative form, for use with nag_pde_parab_1d_cd (d03pfc), nag_pde_parab_1d_cd_ode (d03plc) and nag_pde_parab_1d_cd_ode_remesh (d03psc) |
| d03pxc | 7 | nag_pde_parab_1d_euler_exact<br>Exact Riemann solver for Euler equations in conservative form, for use with nag_pde_parab_1d_cd (d03pfc), nag_pde_parab_1d_cd_ode (d03plc) and nag_pde_parab_1d_cd_ode_remesh (d03psc) |
| d03pyc | 7 | nag_pde_interp_1d_coll<br>PDEs, spatial interpolation with nag_pde_parab_1d_coll (d03pdc) or nag_pde_parab_1d_coll_ode (d03pjc) |
| d03pzc | 7 | nag_pde_interp_1d_fd<br>PDEs, spatial interpolation with nag_pde_parab_1d_fd (d03pcc), nag_pde_parab_1d_keller (d03pec), nag_pde_parab_1d_cd (d03pfc), nag_pde_parab_1d_fd_ode (d03phc), nag_pde_parab_1d_keller_ode (d03pkc), nag_pde_parab_1d_cd_ode (d03plc), nag_pde_parab_1d_fd_ode_remesh (d03ppc), nag_pde_parab_1d_keller_ode_remesh (d03prc) or nag_pde_parab_1d_cd_ode_remesh (d03psc) |