A. Quarteroni, F. Saleri, P. Gervasio

Scientific Computing
4th Edition. Springer, Milan 2014

Errata Corrige (April 11, 2023)

page 99:
The thesis of Prop. 3.3 is only valid when the nodes x_i are equispaced.

page 102, line 1:
"`rhs = [der0; rhs; dern];`" becomes "`rhs = [der0*0.5; rhs; dern*0.5];`"

page 224, line 2:
"and set $\mathbf{x}_i^{(0)} = \tilde{\mathbf{x}} + \eta \mathbf{e}_i$ for $i = 0, \dots, n$,"
becomes
"and set $\mathbf{x}_0^{(0)} = \tilde{\mathbf{x}}$ and $\mathbf{x}_i^{(0)} = \tilde{\mathbf{x}} + \eta \mathbf{e}_i$ for $i = 1, \dots, n$,"

page 227:, formula (7.32)

$$f(\mathbf{x}) = \frac{2}{5} - \frac{1}{10}(5x_1^2 + 5x_2^2 + 3x_1x_2 - x_1 - 2x_2)e^{-(x_1^2+x_2^2)}$$

becomes

$$f(\mathbf{x}) = \frac{2}{5} - \frac{1}{10}(5x_1^2 + 5x_2^2 + 6x_1x_2 - x_1 - 2x_2)e^{-(x_1^2+x_2^2)}$$

page 240:, formula (7.50) (*Fletcher–Reeves (1964)*)

$$\beta_k^{FR} = -\frac{\|\nabla f(\mathbf{x}^{(k)})\|^2}{\|\nabla f(\mathbf{x}^{(k-1)})\|^2}$$

becomes

$$\beta_k^{FR} = -\frac{\|\nabla f(\mathbf{x}^{(k+1)})\|^2}{\|\nabla f(\mathbf{x}^{(k)})\|^2}$$

page 240:, formula (7.51) (*Polak–Ribière (1969)*

$$\beta_k^{PR} = -\frac{\nabla f(\mathbf{x}^{(k)})^T(\nabla f(\mathbf{x}^{(k)}) - \nabla f(\mathbf{x}^{(k-1)}))}{\|\nabla f(\mathbf{x}^{(k-1)})\|^2}$$

becomes

$$\beta_k^{PR} = -\frac{\nabla f(\mathbf{x}^{(k+1)})^T(\nabla f(\mathbf{x}^{(k+1)}) - \nabla f(\mathbf{x}^{(k)}))}{\|\nabla f(\mathbf{x}^{(k)})\|^2}$$

page 240:, formula (7.52) (*Hestenes–Stiefel (1952)*)

$$\beta_k^{HS} = -\frac{\nabla f(\mathbf{x}^{(k)})^T(\nabla f(\mathbf{x}^{(k)}) - \nabla f(\mathbf{x}^{(k-1)}))}{\mathbf{d}^{(k-1)^T}(\nabla f(\mathbf{x}^{(k)}) - \nabla f(\mathbf{x}^{(k-1)}))}$$

becomes

$$\beta_k^{HS} = -\frac{\nabla f(\mathbf{x}^{(k+1)})^T(\nabla f(\mathbf{x}^{(k+1)}) - \nabla f(\mathbf{x}^{(k)}))}{\mathbf{d}^{(k)^T}(\nabla f(\mathbf{x}^{(k+1)}) - \nabla f(\mathbf{x}^{(k)}))}$$

page 309, line 16–18:
" This λ is a candidate to replace the one entering in the stability conditions (such as, e.g., (8.30)) that were derived for the scalar Cauchy problem."
becomes
" This λ is the natural candidate to replace the one entering in the stability condition (8.30) derived for the Cauchy scalar problem. When instead the eigenvalues of $\mathrm{A}(t)$ are complex, they all need to satisfy the condition (8.30)."
page 322, line 14: "The function `ode23s` implements a linear implicit multistep method based on Rosenbrock methods"
becomes:
"The function `ode23s` implements a linear implicit one–step method based on Rosenbrock methods"