Corrections for the book
“NEWTON-TYPE METHODS FOR OPTIMIZATION AND VARIATIONAL PROBLEMS”
by A.F.Izmailov and M.V.Solodov
Springer Series in Operations Research and Financial Engineering
Springer International Publishing, Switzerland, 2014

Page 19, the line before Theorem 1.25.
The reference should be to [63, Theorem 1.4] (instead of [63, Theorem 4.1]).

Page 46, Proposition 1.55 should read as follows:

> *Let* $\varphi_i : \mathbb{R}^n \to \mathbb{R}$, $i = 1, \ldots, m$, *be continuous at a point* $x \in \mathbb{R}^n$, *and define the function*
> $$\varphi(\cdot) = \max_{i=1,\ldots,m} \varphi_i(\cdot).$$
> *Let* φ_i, $i \in I(x)$, *be differentiable near* x, *with their derivatives being continuous at* x, *where*
> $$I(x) = \{i = 1, \ldots, m \mid \varphi_i(x) = \varphi(x)\}.$$
> *Then it holds that*
> $$\partial_B \varphi(x) \subset \{\varphi_i'(x) \mid i \in I(x)\},$$
> $$\partial \varphi(x) = \mathrm{conv}\{\varphi_i'(x) \mid i \in I(x)\},$$
> *and the first relation holds as equality provided that for each* $i \in I(x)$ *there exists a sequence* $\{x^{i,k}\} \subset \mathbb{R}^n$ *convergent to* x *and such that* $I(x^{i,k}) = \{i\}$ *for all* k.

(Currently φ is used before it is defined.)

Page 102, formula (2.97):
r^k should be s^k, and s^k should be r^k. (The roles of r^k and s^k interchanged).

Page 103, the first displayed formula:
r^k should be s^k, and s^k should be r^k. (The roles of r^k and s^k interchanged).

Page 150, the sentence after Proposition 3.8 should read as follows:

> For Ψ_{NR}, this fact readily follows from Propositions 1.73 and 1.75.

(Instead of from Proposition 1.75 only.)

Page 160, last paragraph:
$\bar{\xi}$ should be ξ (twice). (There should be no $\bar{\xi}$ in this argument.)

Page 184, Remark 3.44 (also Page 189, Theorem 3.49).
Subsequent to completing this book, it was pointed out in

R. Cibulka and A.L. Dontchev. A nonsmooth Robinson's inverse function theorem in Banach spaces. Math. Program. 2015. DOI 10.1007/s10107-015-0877-2

that the presented proof of this theorem (which is similar to the one in the original paper [131]) is missing the argument demonstrating that $x_J(\cdot)$ is continuous with respect to J.

A detailed discussion of this issue and a fix for this gap, quite similar to the one suggested at Step 3 of the argument in the paper by Cibulka and Dontchev cited above, can be found in

A.F. Izmailov. Strongly regular nonsmooth generalized equations (revised). http://www.optimization-online.org/DB_HTML/2012/07/3521.html

Page 212, formula (4.19):
r^k should be s^k, and s^k should be r^k. (The roles of r^k and s^k interchanged.)

Page 213, the second displayed formula after (4.21):
$\tilde{r}^k$ should be s^k, and s^k should be $\tilde{r}^k$. (The roles of $\tilde{r}^k$ and s^k interchanged.)

Page 237, the sentence following (4.97). This sentence (including the displayed formula) should be moved to the beginning of the previous paragraph; the resulting change would read:

Furthermore, the last line in (4.81) can be written in the form

$$\min\{\mu^{k+1},\, -g(x^k) - g'(x^k)(x^{k+1} - x^k) - \omega_3^k\} = 0.$$

Since $\{g_{\{1,\ldots,m\}\setminus A(\bar{x})}(x^k)\} \to g_{\{1,\ldots,m\}\setminus A(\bar{x})}(\bar{x}) < 0$ while at the same time $\{(\omega_3^k)_{\{1,\ldots,m\}\setminus A(\bar{x})}\} \to 0$ (see (4.91)), this evidently implies that for each k large enough it holds that $\mu^{k+1}_{\{1,\ldots,m\}\setminus A(\bar{x})} = 0$, and hence

$$\min\{\mu^{k+1}_{\{1,\ldots,m\}\setminus A(\bar{x})},\, -g_{\{1,\ldots,m\}\setminus A(\bar{x})}(x^{k+1})\} = 0. \tag{4.97}$$

Page 268, Theorem 4.40. In the 4th line above (4.189), $(\tilde{\lambda}^k, \tilde{\mu}^k)$ should be replaced by $(\tilde{\lambda}^{k+1}, \tilde{\mu}^{k+1})$.

Page 307, Remark 5.2. The last sentence should read as follows:

Observe that, by the differentiability of Φ at x^k, and by (5.3),

$$\Phi(x^k + \alpha p^k) = \Phi(x^k) + \alpha\Phi'(x^k)p^k + o(\alpha) = (1 - \alpha)\Phi(x^k) + o(\alpha)$$

as $\alpha \to 0$. Hence, if $\Phi(x^k) \neq 0$, then (5.8) is satisfied for all $\alpha > 0$ small enough.

(Assumption $\Phi(x^k) \neq 0$ is needed for the last conclusion.)

Page 384, the sentence following the second displayed formula:
"first inequality in (6.40)" should be "second inequality in (6.40)".

Page 384, formula (6.55).
In the left-hand side, c_{k+1} should be replaced by c_k.

Page 489, the proof of Theorem 7.21.
For the first displayed formula in the proof, establishing the first equality in this chain requires a simple additional argument saying that from $\mathrm{dist}(\tilde{u}, \bar{U}) \to 0$ it follows that $\tilde{x} \to \bar{x}$.