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ERRATA

CORRECTIONS TO VOLUME 21, NUMBER 2, SPRING 1991.

1. "NODAL PROPERTIES OF SOLUTIONS OF PARABOLIC EQUATIONS."

By Sigurd Angenent.

1. Page 591. The first line is missing a minus sign and should read: The difference $v = w^1 - w^2$ satisfies a linear equation of the form

The line after Equation (11) is missing a minus sign and should read: where $\beta(s,t) = \int_0^s k(s',t)^2\,ds' - s\int_0^1 k(s',t)^2\,ds'$ [**1**].

2. "ALMOST PERIODICITY AND DEGENERATE PARABOLIC EQUATIONS."

By Marco Biroli.

1. Page 593. Equation (1.1) is missing a minus sign and should read:

$$D_t u - \Delta\beta(u) \ni f, \qquad \beta(u)_{|\Gamma} = 0 \tag{1.1}$$

2. Page 594. The first line of Equation (H) is missing a minus sign and should read:

$$c_1|r|^m - c_2 \le \Phi(r) \le c_3|\beta(r)|^2 + c_4$$

Equations (1.4) and (1.5) are missing minus signs and should read:

$$\beta(r) = -r^- + (r-1)^+ \quad \text{(Stefan case)} \tag{1.4}$$

$$\beta(r) = |r|^{m-2}r \quad \text{(Porous media case).} \tag{1.5}$$

The sixth and seventh line in **Corollary 1** are missing minus signs and should read:

solution of a Cauchy problem for (1.1) *with initial data* u_0 *in* $H^{-1}(\Omega)$ *with* $\beta(u)$ *in* $L^2(\Omega)$, *we have* $\lim_{t\to+\infty}(\beta(u)-\beta(\tilde{u}))=0$ *in* $L^2(\Omega)$.

The ninth line in **Corollary 1** is missing minus signs and should read:

$H^{-1}(\Omega)$, *then* $\beta(u_1)=\beta(u_2)$ *and* (u_1-u_2) *is independent of* t.

Equation (1.1') is missing a minus sign and a Γ and should read:

$$D_t\psi(v)-\Delta v \ni f, \qquad v_{|\Gamma}=0 \tag{1.1'}$$

3. Page 595. The sixth line of **Corollary 2** is missing a minus sign and should read:

$\lim_{t\to+\infty}(\tilde{u} - u) = 0$ *in* $L^m(\Omega)$.

Equation (2.1) is missing minus signs and a Γ and should read:

$$D_t\tilde{u}-\Delta\beta(\tilde{u})\ni f$$
$$\beta(\tilde{u})_{|\Gamma}=0, \qquad \tilde{u}(0)=u_0\in H^{-1}(\Omega)$$

In the paragraph following Equation (2.1) the first line is missing a minus sign and should read:

From the results of [**4**], (2.1) has a solution in $H^1(0,T;H^{-1}(\Omega))$, with

4. Page 597. The second line following Equation (2.11) is missing a minus sign and should read:

implies that uniform continuity on R of u in $H^{-1}(\Omega)$.

5. Page 599. In Equations (4.1)–(4.4) replace the “thick dot” with a minus sign.

6. Page 600. From the third paragraph through Equation (4.8) replace the “thick dot” with a minus sign.

7. Page 601. In Equations (4.9), (4.10), the paragraph following (4.10), and Equation (4.11) replace the “thick dot” with a minus sign.

3. "PHASE FIELD MODELS AND SHARP INTERFACE LIMITS: SOME DIFFERENCES IN SUBTLE SITUATIONS."

By G. Caginalp.

1. Page 604. Equation (1.6) is missing a Γ and should read:

$$\Gamma(t) = \{x \in \Omega : \phi(t,x) = 0\}. \tag{1.6}$$

2. Page 605. The second line is missing a Γ and should read:

been considered in terms of global minimizers and Γ convergence [**2**].

In Section **2** Γ's are also missing. In the first paragraph, the second, fourth, and eighth line should read, respectively:

equations (1.2), (1.3) is the temperature at the interface Γ. The
and that it does so as an internal layer. Otherwise, Γ may be the empty

Γ will either be a closed curve or it will intersect with the external

In the second paragraph, line six should read:

interface, Γ. With surface tension, σ, calculated from (1.1) as $2/3\xi$ and

Equation (2.1) should read:

$$\Delta s u(x) = -\sigma\kappa(x) + O(\xi^2), \qquad x \in \Gamma \tag{2.1}$$

3. Page 606. The first line and Equation (2.2) are repeated and should be deleted.

In the fourth paragraph, the fourth line should read:

defined in an annular region, does there exist a curve Γ such that

The first line after Equation (2.3) and the fifth line should read, respectively:

for all points x on Γ? Under suitable conditions on u_∂, it was shown
with the appropriate transition layer (at Γ satisfying (2.3)) was proven

4. Page 607. In paragraph two, the first line is missing a minus sign and should read:

Specifically, if $G'(\phi) \equiv \phi - \phi^3$ in (1.2), (1.3), then the $O(1)$ solution

Equation (3.3) is missing a minus sign and should read:

$$u \cong -\frac{2}{3}\frac{\xi}{\sqrt{a}}(\kappa + \alpha v) \tag{3.3}$$

The following five lines were omitted and should be added to the end of the last paragraph:

differs from the limit discussed in Section 2, in which the surface tension and interfacial thickness are both $O(\xi)$. We note that these results can also be attained in anisotropic situations. In two dimensions, anisotropy may be incorporated into the model by modifying $\Delta\phi$ into $\Delta\phi + \xi_1^2 \phi_{xx}$ with the result [**9**]

5. Page 609. Some Γ's were left out in Sections 3 and 4. The last line in the paragraph following Equation (3.5) should read:

curve $\Gamma(t)$ such that

Equation (3.7) should read:

$$l v_n = K(\nabla u_S - \nabla u_L) \cdot \hat{n} \quad \text{on } \Gamma \tag{3.7}$$

The second line in the paragraph following Equation (3.8) should read:

positive (analogously Ω_2 is the solid region with u negative) while $\Gamma(t)$

6. Page 610. Equation (3.11) should read:

$$\Delta s u(t,x) = -\sigma\kappa(t,x) - c_1 \sigma v(t,x), \qquad x \in \Gamma. \tag{3.11}$$

7. Page 611. Equations (4.2) and (4.3) should read:

$$l v_n = K(\nabla u_S - \nabla u_L) \cdot \hat{n} = 0 \quad \text{on } \Gamma \tag{4.2}$$

$$u = -\frac{\sigma}{\Delta s}\kappa_0 \quad \text{on } \Gamma \tag{4.3}$$

The line following Equation (4.3) should read:

then (u, Γ) will not change with time. Suppose further that $u =$

4. "STABILITY OF INTERFACES WITH VELOCITY CORRECTION TERM."

By J. Chadam and G. Caginalp.

1. Page 623. Figure 1 is missing some symbols and should appear as printed.

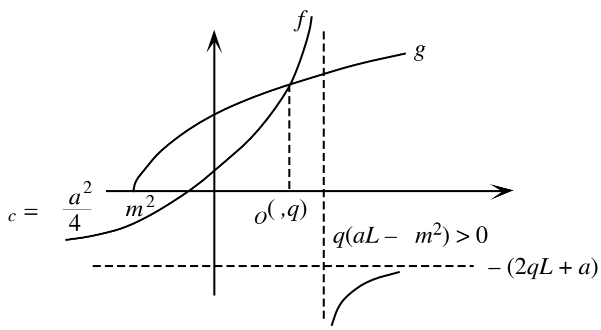

FIGURE 1. Intersection of curves for $p < 1$.

2. Page 626. Figure 3 is missing a σ and should appear as printed.

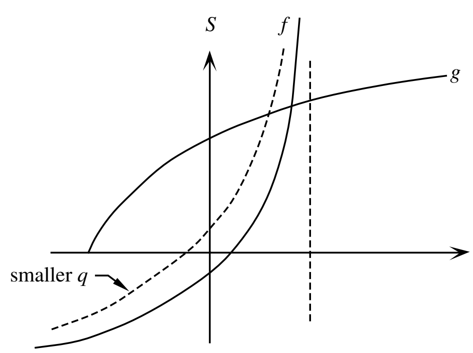

FIGURE 3.

3. Page 628. In the fifth line of text the minus signs are faint. It should read:

Substituting $\sigma_c \equiv -a^2/4 - m^2$ into $f(m,\sigma)$, we write

In Equation (5.1) the denominator is missing a left parenthesis and the minus signs are faint. It should read:

$$f(\sigma_c) = \frac{\left(-\frac{a^2}{4} - m^2\right)(2Lq + a) + (La + \gamma m^2)aq}{\left(-\frac{a^2}{4} - m^2\right) + (La - \gamma m^2)q}. \tag{5.1}$$

In Equation (5.2) the minus signs are faint and it should read:

$$-\sqrt{a^2 + 4(\sigma + m^2)} = \frac{(-2L + La^2 + a\gamma m^2)/|\sigma| + a/q}{|La - \gamma m^2|/|\sigma| + 1/q}. \tag{5.2}$$

5. “A MATHEMATICAL PROBLEM IN GEOCHEMISTRY: THE REACTION-INFILTRATION INSTABILITY.”

By J. Chadam and P. Ortoleva.

1. Page 634. Equation (3.12) should read:

$$\nabla \cdot (\phi\lambda(\phi)\nabla p) = \varepsilon\left(\frac{\partial\phi}{\partial t} - \mu\frac{\partial\phi}{\partial\sigma}\right) \tag{3.12}$$

2. Page 636. In the first paragraph, line one is missing a minus sign. It should read:

Combining (3.16) with the integral from $\xi = -\infty$ to $\xi = +\infty$ of

In Equation (3.17) the minus signs are too high. It should read:

$$\lim_{S\to 0-}\frac{\partial p_0}{\partial n} = \left(\lim_{S\to 0-}\phi_0\lambda(\phi_0)/\lim_{S\to 0+}\phi_0\lambda(\phi_0)\right)\lim_{S\to 0+}\frac{\partial p_0}{\partial n}. \tag{3.17}$$

Equations (3.18), (3.19), (3.21) have missing minus signs. They should read, respectively:

$$(3.18)\quad p- = p+, \qquad (3.19)\quad \frac{\partial p-}{\partial x} - \frac{\partial p-}{\partial y}\cdot\frac{\partial R}{\partial y} = \Gamma\left(\frac{\partial p+}{\partial x} - \frac{\partial p+}{\partial y} + \frac{\partial R}{\partial y}\right), \quad \left.\right\} \text{on } X = R(y,t),\ 0 \le y \le L,$$

$$(3.20)\quad \gamma \equiv 1 \qquad (3.21)\quad \frac{\partial \gamma}{\partial x} - \frac{\partial \gamma}{\partial y}\cdot\frac{\partial R}{\partial y} = (1-\phi_0/\phi_f)R_t, \quad \left.\right\} \text{on } X = R(y,t),\ 0 \le y \le L.$$

In the paragraph following Equation (3.21), line four should read:
$(\pi/L)^2(1-\phi_0/\phi_f)^{-1}t$ with $R' = (\pi/L)R$ (and dropping the primes)

Equations (3.4′) and (3.21′) are missing minus signs and should read, respectively:

$$3.4' \qquad \gamma \to 0, \qquad \phi \to \phi_f, \qquad \frac{\partial p}{\partial x} \to -\frac{v_f L}{D_f \pi} \quad \text{as } x \to -\infty$$

$$3.21' \qquad \frac{\partial \gamma}{\partial x} - \frac{\partial \gamma}{\partial y}\cdot\frac{\partial R}{\partial y} = R_t \quad \text{on} \quad x = R(y,t), 0 \le y \le \pi.$$

3. Page 637. Figure 2 is missing a δ and appears as corrected:

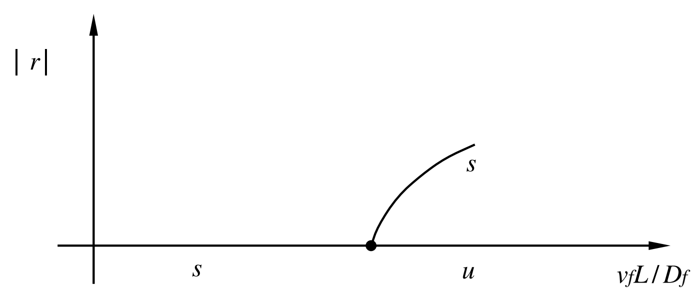

FIGURE 2. Pitchfork stability diagram indicating loss of stability of planar ($\delta r = 0$) to nonplanar ($\delta r \neq 0$) solutions in terms of the bifurcation parameter $v_f L/D_f$.

First paragraph, second line is missing a Γ. It reads:
measure of the porosity change $\Gamma = \phi_0\kappa_0/\phi_f\kappa_f$.

Section **4.**, line eleven is missing a Γ. It reads:
the parameter ν_f (in terms of Γ) for which the planar solution loses

4. Page 638. Equation (4.5a) is missing Γ's. It reads:

$$r'_{\mathrm{m}}(t) = \frac{\overline{\nu}_f}{1+\Gamma}\left(\overline{\nu}_f - (\overline{\nu}_f^2 + 4m^2)^{1/2} + (1-\Gamma)|m|\right) r_{\mathrm{m}}(t). \tag{4.5a}$$

5. Page 639. Equation (4.5b) missing Γ's. It reads:

$$|m_0| = \frac{2(1-\Gamma)}{(3-\Gamma)(1+\Gamma)}\overline{\nu}_f. \tag{4.6}$$

The third line of text following (4.5b) is missing Γ; it should read:
bations (because $\Gamma < 1$) and stable to short wavelength perturbations.

Equations (4.6) and (4.7) are missing Γ's. They read:

$$|m_0| = \frac{2(1-\Gamma)}{(3-\Gamma)(1+\Gamma)}\overline{\nu}_f. \tag{4.6}$$

$$\nu_c = \nu_c(\Gamma) = \frac{(3-\Gamma)(1+\Gamma)\pi}{2(1-\Gamma)}. \tag{4.7}$$

The last line on the page is missing Γ. It reads:
stabilizing, as mentioned earlier). The limit of $\Gamma \to 1$ (i.e., no porosity

6. Page 641. In Figure 4 and the caption there are missing symbols. It should appear like this:

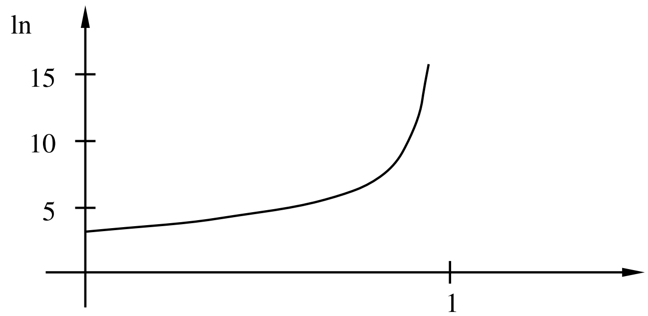

FIGURE 4. Graph of the logarithm of the Landau constant versus $\Gamma = \phi_0\kappa_0/\phi_f\kappa_f$, a measure of the porosity change.

Equation (4.14) is missing Γ's, and the line following it. They read:

$$w = w(\Gamma) = \frac{\nu_c}{1+\Gamma}\frac{((\nu_c^2+4)^{1/2}-\nu_c)}{(\nu_c^2+4)^{1/2}} \geq 0 \tag{4.14}$$

and the Landau constant, $\Lambda = \Lambda(\Gamma)$, which is algebraically very

6. "MISCIBLE DISPLACEMENT IN POROUS MEDIA INFLUENCED BY MOBILE AND IMMOBILE WATER."

By Ulrich Hornung.

1. Page 651. The sixth equation after the words, "one obtains", should read:

$$\left(1-\frac{h}{2}A\right)v'_{j+1} = A\left(v_j + \frac{h}{2}v'_j\right) + b.$$

The equation immediately following the line "equations in the form" should read:

$$\theta_1\partial_t v + \theta_0\partial_t w = Av + b, \qquad \partial_t w = \alpha(v-w).$$

2. Page 654. The "dot" appearing in each equation on the page should be replaced with a minus sign.

3. Page 655. At the bottom of the page after the words "we have used the standard ... ", a left parenthesis is missing:

Let $\Delta x = L/(n+\frac{1}{2})$ and $x_i = \left(i+\frac{1}{2}\right)\Delta x$ for $i = 0,\ldots,n$. Then one

Immediately following, the last equation on the page contains "thick dots" which should be minus signs.

$$\begin{aligned}(Av+b)(x_i) = {} & \frac{D}{(\Delta x)^2}(v(x_{i+1}) - 2v(x_i) + v(x_{i-1})) \\ & - \frac{u}{2\Delta x}(v(x_{i+1}) - v(x_{i-1})) \quad \text{for } i = 1,\ldots,n\end{aligned}$$

4. Page 659. Lines six, seven, twelve and thirteen are missing Γ's, and should read, respectively:

$$\Gamma = \partial Y_0 = \text{ representative interface}$$
$$\nu = \text{ inner normal on } \Gamma \text{ with respect to } Y_0$$
$$\Gamma^\varepsilon + \Omega \cap \bigcup \{\varepsilon\Gamma^m : m \in \mathbf{R}^3\} = \text{ interface}$$
$$\nu^\varepsilon = \text{inner normal on } \Gamma^\varepsilon \text{ with respect to } \Omega_0^\varepsilon.$$

5. Page 660. Equations (5.1) and (5.4) are missing minus signs and should read:

$$\vec{u}^\varepsilon(x) = -k\nabla p(x), \qquad x \in \Omega_1^\varepsilon \tag{5.1}$$
$$\theta_1 \partial_t v^\varepsilon(t,x) = d\Delta v^\varepsilon(t,x) - \vec{u}^\varepsilon \cdot \nabla v^\varepsilon(t,x), \tag{5.4}$$

Equations (5.3), (5.5) and (5.6) are missing Γ's and should read:

$$\nu^\varepsilon \cdot \vec{u}^\varepsilon(x) = 0, \qquad x \in \Gamma^\varepsilon \tag{5.3}$$
$$w^\varepsilon(t,x) = v^\varepsilon(t,x), \qquad t > 0, x \in \Gamma^\varepsilon \tag{5.5}$$
$$\varepsilon^2 \alpha \nu^\varepsilon \cdot \nabla w^\varepsilon(t,x) = d\nu^\varepsilon \cdot \nabla v^\varepsilon(t,x), \qquad t > 0, x \in \Gamma^\varepsilon \tag{5.6}$$

The equation following the words "is a Z-periodic solution of the cell problem" should read:

$$\begin{cases} \Delta_y \sigma_j(y) = 0, & y \in Y_1 \\ \nu \cdot \nabla_y \sigma_j(y) = -\nu \cdot \vec{e}_j, & y \in \Gamma. \end{cases}$$

In the set of equations at the bottom of the page, the middle equation should read:

$$\begin{cases} \theta_0 \partial_t r(t,y) = \alpha \Delta_y r(t,y), & t > 0, y \in Y_0 \\ r(t,y) = 0, & t > 0, y \in \Gamma \\ r(t,y) = 1, & t = 0, y \in Y_0. \end{cases}$$

6. Page 661. The first equation should read:

$$\rho(t) = \fint_{Y_0} r(t,y)\,dy = \frac{1}{|Y_0|}\int_{Y_0} r(t,y)\,dy.$$

The third equation should read:

$$r(t,y) = \frac{2}{\pi}\sum_{k=1}^{\infty}\frac{(-1)^{k-1}}{k}e^{-k^2\pi^2\alpha t}\sin\left(k\pi\frac{|y|}{R}\right),$$

The "square dots" in the equations should be replaced with minus signs.

7. Page 662. Equation (5.15) is missing Γ and should read:

$$\begin{aligned}\varepsilon^{-1}\nu\cdot\nabla_y p^0(x,y) + \varepsilon^0\nu\cdot(\nabla_y p^1(x,y) + \nabla_x p^0(x,y))\\ + \varepsilon^1\nu\cdot(\nabla_y p^2(x,y) + \nabla_x p^1(x,y)) + \varepsilon^2\cdots = 0, \qquad y\in\Gamma.\end{aligned}\tag{5.15}$$

8. Page 663. Equation (5.17) is missing minus signs and should read:

(5.17)

$$\begin{aligned}&-\varepsilon^{-2}d\Delta_y v^0(x,y)\\ &-\varepsilon^{-1}(d\Delta_y v^1(x,y)\\ &+2d\nabla_y\cdot\nabla_x v^0(x,y) - \vec{u}^0(x,y)\cdot\nabla_y v^0(x,y))\\ &+\varepsilon^0(\theta_1\partial_t v^0(x,y) - d\nabla_y\cdot(\nabla_y v^2(x,y) + \nabla_x v^1(x,y))\\ &\qquad - d\nabla_x\cdot(\nabla_y v^1(x,y) + \nabla_x v^0(x,y))\\ &+\vec{u}^1(x,y)\cdot\nabla_y v^0(x,y) + \vec{u}^0(x,y)\cdot\nabla_x v^0(x,y)) + \varepsilon^1\cdots = 0, \qquad y\in Y_1.\end{aligned}$$

Equation (5.18) and (5.19) are missing minus signs and Γ's and should read, respectively:

$$\varepsilon^0(w^0(x,y) - v^0(x,y)) + \varepsilon^1\cdots = 0, \qquad y\in\Gamma.\tag{5.18}$$

$$\begin{aligned}&\varepsilon^{-1}d\nu\cdot\nabla_y v^0(x,y) + \varepsilon^0\, d\nu\cdot(\nabla_y v^1(x,y) + \nabla_x v^0(x,y))\\ &\quad + \varepsilon^1(d\nu\cdot(\nabla_y v^2(x,y) + \nabla_x v^1(x,y)) - \alpha\nu\cdot\nabla_y w^0(x,y))\\ &\quad + \varepsilon^2\cdots = 0, \qquad y\in\Gamma.\end{aligned}\tag{5.19}$$

Replace the blurred mark before the α in Equation (5.20) with a minus sign.

The equation following (5.20) should read:

$$\begin{cases} \Delta_y p^0(x,y) = 0, & y \in Y_1 \\ \nu \cdot \nabla_y p^0(x,y) = 0, & y \in \Gamma. \end{cases}$$

The equation at the bottom of the page should read:

$$\begin{cases} \Delta_y p^1(x,y) = 0, & y \in Y_1 \\ \nu \cdot \nabla_y p^1(x,y) = -\nu \cdot \nabla_x p(x), & y \in \Gamma. \end{cases}$$

10. Page 665. The first equation is missing a Γ and should read:

$$\begin{cases} \nabla_y \cdot (\nabla_y p^2(x,y) + \nabla_x p^1(x,y)) + \nabla_x \cdot (\nabla_y p^1(x,y) + \nabla_x p(x)) = 0, \\ \qquad\qquad\qquad\qquad y \in Y_1 \\ \nu \cdot (\nabla_y p^2(x,y) + \nabla_x p^1(x,y)) = 0, \\ \qquad\qquad\qquad\qquad y \in \Gamma. \end{cases}$$

The equation immediately following is missing a Γ and should read:

$$\int_\Gamma \nu \cdot (\nabla_y p^2(x,y) + \nabla_x p^1(x,y))\, d\Gamma(y) \\ + \int_{Y_1} \nabla_x \cdot (\nabla_y p^1(x,y) + \nabla_x p(x))\, dy = 0.$$

The equation after the line beginning with "the ε^-1-power" is missing a Γ:

$$\begin{cases} \Delta_y v^0(x,y) = 0, & y \in Y_1 \\ \nu \cdot \nabla_y v^0(x,y) = 0, & y \in \Gamma. \end{cases}$$

The equation following Equation (5.23) is missing a minus sign and a Γ and should read:

$$\begin{cases} \Delta_y v^1(x,y) = 0, & y \in Y_1 \\ \nu \cdot \nabla_y v^1(x,y) = -\nu \cdot \nabla_x v(x), & y \in \Gamma. \end{cases}$$

11. Page 666. All the blurred marks in the equations should be replaced with a minus sign.

The first set of equations and the second, third and last equation are missing Γ's, and should read, respectively:

$$\begin{cases} \theta_1 \partial_t v(x) = d\nabla_y \cdot (\nabla_y v^2(x,y) + \nabla_x v^1(x,y)) \\ \qquad + d\nabla_x \cdot (\nabla_y v^1(x,y) + \nabla_x v(x)) - \vec{u}^0(x,y) \cdot \nabla_x v(x), & y \in Y_1 \\ d\nu \cdot (\nabla_y v^2(x,y) + \nabla_x v^1(x,y)) = \alpha \nu \cdot \nabla_y w^0(x,y), & y \in \Gamma. \end{cases}$$

$$\Theta_1 \partial_t v(x) = d \int_\Gamma \nu \cdot (\nabla_y v^2(x,y) + \nabla_x v^1(x,y))\, d\Gamma(y)$$
$$+ d \int_{Y_1} \nabla_x \cdot (\nabla_y v^1(x,y) + \nabla_x v(x))\, dy - \vec{u}(x) \cdot \nabla v(x).$$

$$\alpha \int_\Gamma \nu \cdot \nabla_y w^0(x,y)\, dy = -|Y_0| \fint_{Y_0} \alpha \Delta_y w^0(x,y)\, dy.$$

$$\begin{cases} \theta_0 \partial_t w^0(x,y) = \alpha \Delta_y w^0(x,y), & y \in Y_0 \\ w^0(x,y) = v(x), & y \in \Gamma. \end{cases} \tag{5.26}$$

12. Page 667. All the "square dots" should be replaced with minus signs.

The equation following the words "in addition we see that" is missing a Γ and should read:

$$\tilde{w}(t,x,y) = v(t,x) \quad \text{for } y \in \Gamma.$$

7. "SPHERICALLY SYMMETRIC SOLUTIONS OF AN ELLIPTIC-PARABOLIC NEUMANN PROBLEM."

By J. Hulshof.

1. Page 674. In *Remarks* 1, the second line is missing a minus before the infinity sign and should read:

region near $u = 0$ (i.e. c' being positive on $(-\infty, 0]$) is only needed

In it Remarks 3, the third line is missing a minus sign and should read:

terms in the equation for $-u_t/u_r$.

Equation (1.16) is missing a minus sign and should read:

$$\liminf_{t\uparrow T_s} \zeta(t)(T_s - t)^{-1/n} > 0 \tag{1.16}$$

2. Page 675. In Figure 2 some symbols are missing and it appears as

follows:

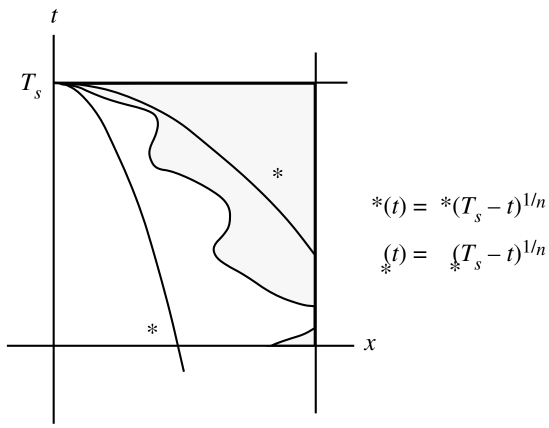

FIGURE 2. The interface ζ for $n \geq 3$; γ^* and γ^* are positive constants with $\gamma^* < \gamma^*$.

Equation (1.18) is missing a minus sign and should read:

$$\zeta(t) \sim (T_s - t)^{1/n} \quad \text{as } t \uparrow T_s. \tag{1.19}$$

3. Page 677. Equation (3.4) is missing a minus sign and should read:

$$\chi(t) = \gamma^*(T_s - t)^{1/n} \tag{3.4}$$

4. Page 678. The first line and Equation (3.5) are each missing a minus sign and should read:

$0 \leq 1 - c(u)$ is bounded by a constant $\gamma > 0$. Rewriting (1.10) we obtain

$$T_s - t = \int_0^1 r^{n-1}(1 - c(u(r,t)))\, dr \leq \frac{\gamma(\zeta(t))^n}{n} \tag{3.5}$$

5. Page 679. The blurry symbol before K should be replaced with a minus sign.

In Equation (3.18) the "black square" should be replaced with a minus sign.

$$q_t \geq \frac{1}{c_k'(u_k)}\{r^{1-n}(r^{n-1}q_r)_r\} \tag{3.18}$$

6. Page 680. The "black square" should be replaced with a minus sign.

Equations (3.29) and (3.30) are missing minus signs and should read, respectively:

$$1 - c(u(r,t)) \geq \gamma > 0, \qquad 0 \leq r \leq \frac{\zeta(t)}{2},\ 0 \leq t < T_s. \tag{3.29}$$

$$T_s - t = \int_0^1 r^{n-1}(1 - c(u(r,t))\,dr \geq \frac{\gamma}{n}\left(\frac{\zeta(t)}{2}\right)^n \tag{3.30}$$

8. "THE ONE-DIMENSIONAL DISPLACEMENT IN AN ISOTHERMAL VISCOUS COMPRESSIBLE FLUID WITH A NONMONOTONE EQUATION OF STATE."

By K. Kuttler and D. Hicks

1. Page 688. The "small black squares" should be replaced with minus signs in Equation (2.12) and the following equation.

2. Page 689. The blurred symbols should be replaced with minus signs in Equations (2.15.1) and (2.16).

3. Page 690. The blurred symbols should be replaced with minus signs in the equations.

4. Page 691. The blurred symbols should be replaced with minus signs in the text and equations.

5. Page 692. The blurred symbols should be replaced with minus signs in Equation (3.4).

9. "STUDYING SINGULAR SOLUTIONS OF A SEMILINEAR HEAT EQUATION BY A DILATION RESCALING NUMERICAL METHOD."

By B.J. LeMesurier

1. Page 695. Equation (1.2) is missing a minus sign and should read:

$$\phi(t,x)=\kappa(t^*-t)^{-\beta},\qquad \beta=1/(p-1),\qquad \kappa=\beta^{\beta}. \tag{1.2}$$

10. "LOCALLY INVARIANT MANIFOLDS FOR QUASILINEAR PARABOLIC EQUATIONS."

By Alexander Mielke

1. Page 708. The faint symbol resembling a small equal sign should be replaced by a minus sign in Equation (2.3), the second line following, and the equation following. They should read:

$$||(B-z)^{-1}||_{X_2\to X_2}\le \frac{C}{1+|z|}, \tag{2.3}$$

$(e^{Bt})_{t\ge 0}$ with $||e^{Bt}||\le Ce^{-\alpha t}$ for $t\ge 0$.

$$\begin{aligned}
&D_B(\theta)=\{x_2\in X_2 \mid ||s^{\theta}B(B-s)^{-1}x_2||\to 0 \text{ for } s\to\infty\},\\
&||x_2||_{\theta}=\max\{||s^{\theta}B(B-z)^{-1}x_2|| \mid s\ge 0\},\\
&D_B(\theta+1)=\{x_2\in D(B)\mid Bx_2\in D_B(\theta)\},\ ||x_2||_{\theta+1}=||Bx_2||_{\theta}.
\end{aligned}$$

2. Page 710. The blurred symbol before the infinity sign in the paragraph beginning "To find all solutions of (2.2)" should be a minus sign.

Following Equation (2.4) the equation and first line of text should have a minus sign and should read:

$$\begin{aligned}
&Y_{\nu}=\{y\in C((-\infty,0],X_1\times D_B(\theta+1)) \mid |y|_{\nu}<\infty\},\\
&|y|_{\nu}=\sup\{e^{\nu t}(||y_1||+||y_2||_{\theta+1}) \mid t\le 0\}.
\end{aligned}$$

Using the estimates $||e^{At}|| \leq C(1-t)^m$, $t \leq 0$, $||e^{Bt}|| \leq Ce^{-\alpha t}$, $t \geq 0$,

3. Page 712. The blurred symbol in the first equation after **Definition 3.1.** should be a minus sign:

$$h_p^\sigma(\mathbf{R}^n) = \{u \in L_p(\mathbf{R}^n) \mid |y|^{-\sigma}||u(\cdot + y) - u(\cdot)||_{L_p} \to 0 \ \text{ for } y \to 0\},$$

Equation (4.1) is missing a minus sign and should read:

$$\begin{aligned} \dot{u} - \tilde{L}u &= F(u) && \text{for } x \in \Omega, \\ B_1 u = \cdots = B_m u &= 0 && \text{for } x \in \partial\Omega, \end{aligned} \tag{4.1}$$

11. "GLOBAL EXISTENCE FOR SEMILINEAR PARABOLIC SYSTEMS ON ONE-DIMENSIONAL BOUNDED DOMAINS."

By Jeff Morgan

1. Page 723. The blurred symbol in Equations (3.14) –(3.16) should be replaced with a minus sign.

A minus sign is missing in Equation (3.17). It should read:

$$\begin{aligned} &\int_\tau^T \int_\Omega w[K_1(H(u))^2 + K_2]\,dx\,dt \\ &\leq K_1 C_{p,(T-\tau)} ||H(u)||_2^{b_1[(5p-3)/6p]} ||H(u)||_{p'}^{\varepsilon_{p'}} + K_2 C_p[|\Omega|(T-\tau)]^{1/p'}. \end{aligned} \tag{3.17}$$

2. Page 724. Equation (3.19) is missing a minus sign and should read:

$$\int_\tau^T \int_\Omega H(u) w\,dx\,dt \leq C_{p,(T-\tau)} ||H(u)||_2 [|\Omega|(T-\tau)]^{(3-2p)/3p}. \tag{3.19}$$

The line of text following Equation (3.20) and the line of text following Equation (3.21) are missing minus signs and should read, respectively:

and from our hypothesis and (3.8), for all $1 \leq j \leq k-1$, we have
Finally, from our hypothesis and (3.8), for all $1 \leq j \leq k-1$, we have

12. "SINGULAR LIMIT APPROACH TO STABILITY AND BIFURCATION FOR BISTABLE REACTION DIFFUSION SYSTEMS."

By Yasumas Nishiura

1. Page 733. In **Theorem 2.1** line nine is missing a minus sign and should read:

where $I_\kappa = (x_1^* - \kappa, x_1^* + \kappa)$ *and* x_1^* *denotes the layer position of the*

In Equation (2.1) the blurred symbol should be replaced with a minus sign:

$$\lambda_c(\varepsilon) \simeq -\tau_N^* \varepsilon \quad \text{as } \varepsilon \downarrow 0, \tag{2.1}$$

2. Page 736. Figure 3b is missing infinity signs. It should appear as below:

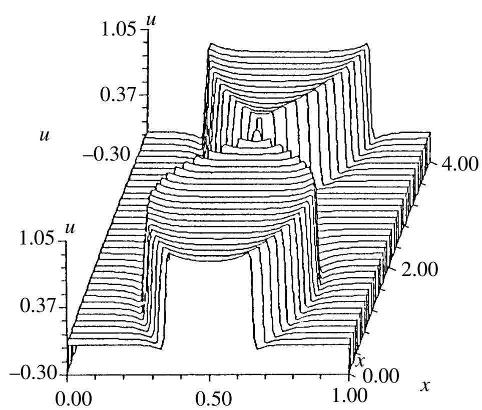

FIGURE 3b. Layer oscillation for small τ.

The line before the last line is missing a minus sign and should read:

The first question may be on the existence of the resolvent $(L^\varepsilon - \varepsilon\tau\lambda)^{-1}$.

3. Page 738. In **Lemma 2.2** a faint equal sign should be replaced by a minus sign. The first equation, the first line of the paragraph starting with "Roughly speaking," and Equations (2.9) and (2.10) should read, respectively:

$$(L^\varepsilon - \varepsilon\tau\lambda)^\dagger(F^\varepsilon h) \underset{\varepsilon\downarrow 0}{\longrightarrow} F^* h/f_u^* \quad \text{in strong } L^2\text{-sense}$$

Roughly speaking, this lemma says that $(L^\varepsilon - \varepsilon\tau\lambda)^\dagger$ converges to the

$$\lim_{\varepsilon\downarrow 0} g_u^\varepsilon (L^\varepsilon - \varepsilon\tau\lambda)^\dagger(-f_v^\varepsilon z) = -\frac{g_u^* f_v^*}{f_u^*} z. \tag{2.9}$$

$$[\text{the second term of (2.8)}] = \frac{\langle z, -f_v^\varepsilon \varphi_0^\varepsilon/\sqrt{\varepsilon}\rangle}{\zeta_0^\varepsilon/\varepsilon - \tau\lambda} g_u^\varepsilon \varphi_0^\varepsilon/\sqrt{\varepsilon}. \tag{2.10}$$

In **Lemma 2.3.** , the statement (a) is missing minus signs and should read:

(a) $\lim_{\varepsilon\downarrow 0} \frac{-f_v^\varepsilon}{\sqrt{\varepsilon}} \varphi_0^\varepsilon = c_1^* \delta^*$ in $H^{-1}(I)$-sense

4. Page 739. In the second equation, the minus subscript is missing and should read:

$$c_2^* = \kappa^*\{g(h_+(v^*), v^*) - g(h_-(v^*), v^*)\} > 0$$

5. Page 740. In Equations (2.14), (2.16), (2.17) and the first two equations in *Remark* 2.1, the faint signs should be replaced by minus signs and should read, respectively:

$$z = \frac{\langle z, \delta^*\rangle K_\lambda(\hat{c}\delta^*)}{\hat{\zeta}_0^* - \tau\lambda} \tag{2.14}$$

$$\hat{\zeta}_0^* - \tau\lambda = \langle K_\lambda(\hat{c}\delta^*), \delta^*\rangle. \tag{2.16}$$

$$\mathcal{F}^*(\lambda, \tau) = \hat{\zeta}_0^* - \tau\lambda - G(\lambda). \tag{2.17}$$

$$\hat{\zeta}_0^* - \tau\lambda_{\mathbf{R}} - A = 0$$

and

$$\lambda_I(B - \tau) = 0,$$

6. Page 743. Figure 5 is missing symbols. It should appear as below:

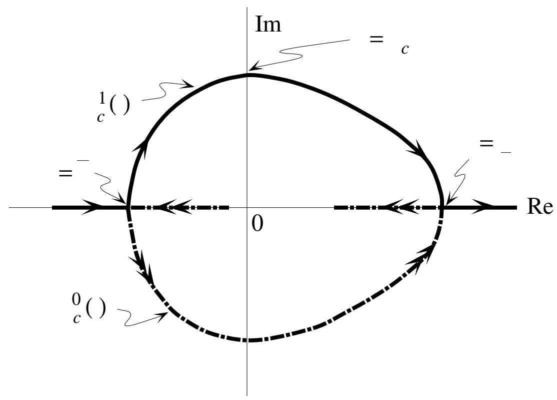

FIGURE 5. Behaviors of critical eigenvalues with respect to τ.

7. Page 749. In Equation (3.13) the minus signs are faint.

$$\phi_0(c,\beta) = \frac{d}{dy}W_0^-(0;c\tau,\beta) - \frac{d}{dy}W_0^+(0;c\tau,\beta). \tag{3.13}$$

8. Page 751. Figure 9 is missing symbols. It should appear as below:

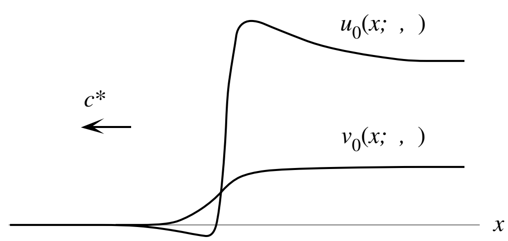

FIGURE 9. Singular limit traveling front solution.

In **Theorem 3.1** line one and line four have a blurred symbol for a minus sign and should read, respectively:

Theorem 3.1. *Suppose that* (A.0)–(A.6) *hold. When* $v^* \in (v_-, v_+)$,
hand, when $v^* \in (v_{\min}, v_{\max}) \backslash (v_-, v_+)$, *it has only one for both small*

9. Page 752. In **Theorem 3.2** the displayed equation has blurred symbols for minus signs and should read:

$$||u(\cdot;\varepsilon;\tau) - u_0(\cdot;\varepsilon;\tau)||_{X^1_{\rho,\varepsilon}(\mathbf{R})} + ||v(\cdot;\varepsilon;\tau) - v_0(\cdot;\varepsilon;\tau)||_{X^1_{\rho,1}(\mathbf{R})} \to 0$$

In **Theorem 3.3** section (b) has a blurred symbol for a minus sign and should read:

(b) *The diagram is invariant under the reverse of the sign of the velocity* $(c \to -c)$.

10. Page 753. In line one and the first line after Equation (3.21) there is a blurred symbol for the minus sign. They should read, respectively:

As for (c), we first expand $\beta_0(c)$ and $\beta_1(c;\tau)$ $(\equiv c_0^{-1}(c\tau))$ into Taylor
where $a_{2k+1} = \frac{d^{2k+1}}{dc^{2k+1}}\beta_0(0)$ and $b_{2k+1} = (d^{2k+1}/d(c\tau)^{2k+1})c_0^{-1}(0)$.

11. Page 754. Equation (3.24) has a blurred symbol for a minus sign and should read:

$$\hat{\zeta}_0^* - \tau\lambda = G(\lambda; c^*, \tau), \tag{3.24}$$

12. Page 755. Equations (3.25) and (3.27) are missing minus signs and should read, respectively:

$$\hat{\zeta}_0^* = -\frac{dc_0(\beta)}{d\beta}\left\{c^*(\beta^* - v_-) - \int_{-\infty}^{0} g(U_0, V_0)\,dx\right\}, \tag{3.25}$$

(3.27)
$$k_1^* = -||W_y^*(y; c_0(\beta^*), \beta^*)||_{L^2}^{-1}\langle W_y, W_y^*\rangle \frac{d}{d\beta}c_0(\beta^*) > 0,$$
$$k_2^* = ||W_y(y; c_0(\beta^*), \beta^*)||_{L^2}^{-1}\{g(h_+(\beta^*), \beta^*) - g(h_-(\beta^*), \beta^*)\} > 0,$$

13. Page 756. Figure 10 is missing some symbols and should appear as below:

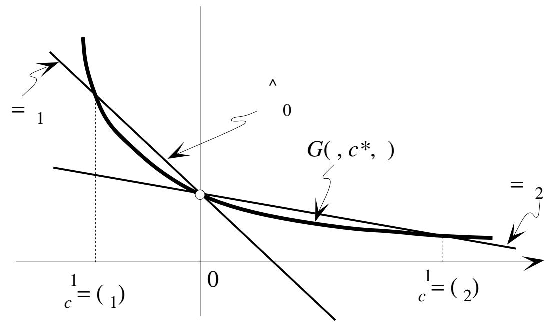

FIGURE 10. Graphs of $\hat{\zeta}_0^* - \tau\lambda$ and $G(\lambda, c^*, \tau)$.

14. Page 758. Figure 11 is missing infinity signs and should appear as below:

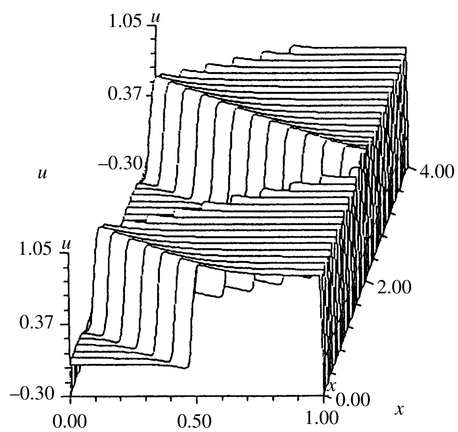

FIGURE 11. Layer oscillation for sufficiently small τ.

Equations (4.1) is missing minus signs, and Equation (4.2) has a blurred symbol for a minus sign. They should read, respectively:

$$\lim_{\hat{l}\downarrow 0,} \sup_{x\in[-\hat{l}^{-1},\hat{l}^{-1}]} \left| \frac{d^k}{dx^k}\mathcal{U}_s^{\varepsilon,\hat{l}} - \frac{d^k}{dx^k}\mathcal{U}_s^{\varepsilon,0} \right| = 0 \tag{4.1}$$

$$\left\{ \sup_{x\in[-\hat{l}^{-1},0]} \left| \frac{d^k}{dx^k}(U_s^{0,\hat{l}} - U_s^{0,0}) \right| + \sup_{x\in[-\hat{l}^{-1},0]} \left| \frac{d^k}{dx^k}(V_s^{0,\hat{l}} - V_s^{0,0}) \right| \right\} \leq C\exp(-\gamma/\hat{l}) \tag{4.2}$$

15. Page 759. In the *Proof* lines eight, fourteen, sixteen and seventeen contain blurred symbols for minus signs and should read, respectively:

component is majorized by const $\cdot \exp(-\gamma/\hat{l})$ since the U-component
0)/ as $x \to -\infty$ with the order $O(\exp(\gamma x))$ for some positive γ. Recalling
saddle critical point, and noting that $V_s^{0,\hat{l}}$ satisfies $(V_s^{0,\hat{l}})_x(-\hat{l}^{-1}) = 0$
and $|V_s^{0,\hat{l}}(-\hat{l}^{-1}) - V_s^{0,0}(-\hat{l}^{-1})| = O(\exp(-\gamma\hat{l}^{-1}))$, we see that the

In the following paragraph, line five has a "thick symbol" that should be a minus sign and the line should read:

only if the straight line $\hat{\zeta}_0^* - \tau\lambda$ is tangent to $G(\lambda; 0)$ at $\lambda = 0$. This

16. Page 760. Equations (4.3) and (4.4) are missing minus signs and should read:

$$\hat{\zeta}_0^{*,\hat{l}} - \tau\lambda = G(\lambda; \hat{l}) \tag{4.3}$$

$$\hat{\zeta}_0^{*,0} - \tau\lambda = G(\lambda; 0). \tag{4.4}$$

17. Page 764. Equations (4.9) and (4.10) have faint minus signs and should read, respectively:

$$G(\lambda; \hat{l}) = G(0, \hat{l}) - \tau_c\lambda + A\lambda^2 + (\text{h.o.t.}), \tag{4.9}$$

$$\hat{\zeta}_0^{*,\hat{l}} - (\hat{\tau} + \tau_c)\lambda = G(0; \hat{l}) - \tau_c\lambda + A\lambda^2 + (\text{h.o.t.}). \tag{4.10}$$

13. "GRADIENT THEORY OF PHASE TRANSITIONS WITH GENERAL SINGULAR PERTURBATIONS."

By Nicholar C. Owen.

1. Page 769. The third line after the displayed equations has a square dot for a minus sign and should read:

of different heights, we consider the integrand $W(\tau) - (\alpha\tau + \beta)$, for

2. Page 770. The second line after the displayed equation at the top of the page has a square dot for a minus sign and should read:

$A \cap B = \phi$ and $|A| = (b|\Omega| - M)\backslash(b-a)$, $|B| = (M - a|\Omega|)\backslash(b-a)$.

In the paragraph beginning "Here, $BV(\Omega)$ is the space ... ", the third line has a square dot for a minus sign and should read:

where H^{n-1} is the $n-1$ dimensional Hausdorff measure. (For further

3. Page 771. The third and fourth line in the third paragraph beginning "The general problem ... " are missing Γ's and should read:

tionals developed by De Giorgi. We refer to [**1**] (where Γ-convergence is called "epi-convergence") for further information on Γ-convergence.

4. Page 774. Section **4. The anisotropic case.** , the second line is missing a Γ and should read:

the direction of ∇u, the Γ-limit will no longer be a simple geometry

5. Page 776. In the paragraph beginning with "As in the isotropic case ... ," the third and fourth lines are missing Γ's. They should read:

converge, in the sense of Γ-convergence, to H_0. We shall give a brief sketch of the proof of the lower semicontinuity property (A) of Γ-

6. Page 777. In Reference 5, a Γ is missing and the line should read:

5. G. Dal Maso, *Integral representation on $BV(\Omega)$ of Γ-limits of variational*

14. "LIMITING BEHAVIOR OF SOLUTIONS OF $u_t = \Delta u^m$ as $m \to \infty$."

By Paul E. Sacks.

1. Page 780. The equation between Equations (0.7) and (0.8) is

missing a minus sign and should read:

$$\Delta\psi = f - 1 \qquad x \in \mathbf{R}^N,$$

2. Page 781. In line six, the blurred symbol should be a minus sign. It reads:

A_∞ in the sense of m-accretive operators, where $A_\infty u =$ "$-\Delta\varphi_\infty(u)$"

Equation (1.5) is missing a minus sign and should read:

$$w(x) \in \varphi_\infty(v(x)) \quad \text{a.e.} \quad \text{and} \quad v - \lambda\Delta w = f \quad \text{in } \mathcal{D}'(\mathbf{R}^N) \tag{1.5}$$

3. Page 784. In Equations (3.4), (3.6) and (3.8), the small square dots should be minus signs. These equations should read:

$$\int_{\mathbf{R}} |u_m(x+h,t) - u_m(x,t)|\, dx \le \int_{\mathbf{R}} |f(x+h) - f(x)|\, dx \tag{3.4}$$

$$0 \le u_m(x,T) \le 1 + \delta \qquad x \in \mathbf{R}. \tag{3.5}$$

$$u_{m_k}(\cdot,t) = S_{m_k}(t-T)u_{m_k}(\cdot,T) \to S_\infty(t-T)u_T^* = u_T^* \tag{3.6}$$

4. Page 785. Equation (3.9) has a faint minus sign and it should read:

$$u^* - (w^*)'' = f \quad \text{in} \quad \mathcal{D}'(\mathbf{R}). \tag{3.9}$$

In Section **4.** , (ii) the first and fourth lines have blurred symbols that should be minus signs. These lines should be, respectively:

(ii) [**7**] the nonlinearities $|u|^{m-1}u$ can be replaced by a more general
valid with the same proofs, if $|u|^{m-1}u$ is replaced by $(|u|^{m-1}u)/m$,

15. "A HYBERBOLIC STEFAN PROBLEM."

By R.E. Showalter and N.J. Walkington.

1. Page 787. The first equation and Equations (1.1) and (1.2) have blurred symbols for minus signs and should read, respectively:

$$\vec{q}(t) = -\int_0^\infty a(s)\nabla u(t-s)\,ds.$$

$$\left(1+\tau\frac{d}{dt}\right)\vec{q} = -k\nabla u, \tag{1.1}$$

$$\tau c u_{tt} + c u_t - k\Delta u = 0 \tag{1.2}$$

2. Page 788. In the seventh line after Equation (2.2) and in the equation following, the minus sign appears as a blurred symbol. This line and equation should read, respectively:

to $\tau_1 F/L$; thereafter, it increases steadily to 1 where $e = L - \tau F$.

$$u = \left(\frac{1}{c_2}\right)\left\{e - (L-\tau F) - F\tau_2\left(1-\exp\left[\frac{-e+L-\tau F}{\tau_2 F}\right]\right)L\right\}.$$

3. Page 789. In the first equation the minus sign is a blurred symbol. It should read:

$$\frac{d}{dt}\int_{G^*}(e+\tau e') = -\int_{\partial G^*}(\vec{q}+\tau\vec{q}\,')\cdot\nabla + \int_{G^*}(F+\tau F').$$

4. Page 790. In Equations (3.2a)–(3.2c), and (3.3a) and (3.3b), the minus sign is a blurred symbol. They should read, respectively:

(3.2a)

$$\frac{\partial}{\partial t}\left(\tau_2 c_2\frac{\partial u}{\partial t} + c_2 u\right) - k_2\Delta u = F + \tau F' \quad \text{in } \Omega_+ - \tilde{S},$$

(3.2b)

$$L\frac{\partial \xi}{\partial t} = F + \tau F' \quad \text{in } \Omega_0 - \tilde{S},$$

(3.2c)

$$\frac{\partial}{\partial t}\left(\tau_1 c_1\frac{\partial u}{\partial t} + c_1 u\right) - k_1\Delta u = F + \tau F' \quad \text{in } \Omega_- - \tilde{S},$$

(3.3a)
$$\left(L(1-\xi)+\tau_2 c_2\frac{\partial u}{\partial t}\right)N_t = k_2\vec{\nabla}u\cdot N_x \quad \text{on } S_+,$$

(3.3b)
$$\left(-L\xi+\tau_1 c_1\frac{\partial u}{\partial t}\right)N_t = k_1\vec{\nabla}u\cdot N_x \quad \text{on } S_-,$$

5. Page 792. In the first and third line after Equation (3.5c), the minus sign appears as an unknown symbol. These lines should read, respectively:

It will always be assumed that $F \in W^{1,\infty}(0,T;H^{-1}(G))$ so it is implicit $W^{1,\infty}(0,T;H^{-1}(G))$. Hence, the initial conditions are meaningful.

The sixth line in **Theorem 1.** has a faint minus sign and should read:

is a $b \in \mathcal{B}(u_0)$ *with* $b - v_0 \in H'$. *Then there exists a unique pair* $u \in$

6. Page 793. The five lines following the first equation have blurred symbols for minus signs. They should read:

so $\mathcal{A} = -\Delta$ is a distribution-valued Laplace operator. Finally, we define $\mathcal{B}(U) = C \circ K^{-1}(U) + LH(U)$, the indicated monotone operator obtained from the L^2-realization of the (multi-valued) maximal monotone graph $C \circ K^{-1}(\cdot) + LH(\cdot)$. That is, $w \in \mathcal{B}(U)$ if and only if $w = C \circ K^{-1}(U) + L\xi = \tau_0 u + L\xi$ with $U = K(u)$ and $\xi \in H(u)$ a.e. in G.

In the first line of **Theorem 2.** , the second line of *Proof.* , and the third line of the paragraph following, the blurred symbol should be replaced with a minus sign.

7. Page 794. Equation (5.1a) has a blurred symbol for a minus sign. It should read:

(5.1a)
$$\frac{d}{dt}(\tau c u'(t) + c u(t) + L\xi(t)) - k\Delta u(t) = 0, \quad \text{a.e. } t \in [0,T],$$

The equation after Equation (5.1c) has a faint minus sign, as does the first line following this equation. They should read:

$$E(U) = c\tau U''(t) + cU'(t) + \alpha U(t) - v_0 + L.$$

An integration in time of (5.1a) yields $E(U) = L(1 - \xi(t))$. Since

The third line after Equation (5.2) and Equation (5.31) have faint minus signs. They read:

$\{1\}$ for $r > 0$ and $\tilde{H}(0) = (-\infty, 1]$, then we can write (5.2) formally as

$$\text{(5.3a)} \qquad \frac{d}{dt}(\tau c u'(t) + cu(t) + L\xi(t)) - k\Delta u(t) = 0, \quad \text{a.e. } t \in [0, T],$$

8. Page 795. The equation following Equation (5.4) has a faint minus sign and should read:

$$\xi(x, t_0^+) \leq 1 \left(\frac{\tau ca}{L}\right) \exp\left(\frac{-\pi}{4a\tau}\right) \sin(\lambda x).$$

16. "VECTOR-VALUED LOCAL MINIMIZERS OF NONCONVEX VARIATIONAL PROBLEMS."

By Peter Sternberg.

1. Page 799. In lines three and five and the line before the last line on the page, replace the blurred symbol before "-convergence" and "-convergent", with Γ.

2. Page 800. In line three, the line before Equation (4), and the first and last line of the paragraph after Equation (5), replace the blurred symbol with Γ.

3. Page 801. In line two a minus sign is missing. The line should read:

$F_0(u_0) < F_0(v)$ *whenever* $0 < ||u_0 - v||_{L^1(\Omega)} \leq \delta$ *for some* $\delta > 0$.

The first and second line of **Lemma.** and the line after Equation (14) have blurred symbols for minus signs. They should read:

Lemma. *For every* $u \in \mathcal{R}^2$*, there exists a curve* $\gamma_u : [-1, 1] \to \mathcal{R}^2$ *such that* $\gamma(-1) = \mathbf{a}$*,* $\gamma(1) = u$ *and*

In the line after Equation (14) the square dots should be replaced with minus signs:

There exists a smooth, increasing function $\beta : (-\infty, \infty) \to (-1, 1)$ *such*

In Equation (15), and the line after Equation (15), the unknown symbol should be minus signs:

$$2g(\mathbf{b}) = \int_{-\infty}^{\infty} W(\zeta) + |\zeta'|^2 \, d\tau, \tag{15}$$

$\lim_{\tau \to -\infty} \zeta(\tau) = \mathbf{a}$, $\lim_{\tau \to \infty} \zeta(\tau) = \mathbf{b}$, *with these limits being attained at an exponential rate.*

4. Page 802. In the first line of **Theorem 2.** the blurred symbol should be replaced with Γ:

Theorem 2. *The sequence* $\{F_\varepsilon\}$ Γ*-converges to* F_0*; that is, condi-*

In *Proof of* (7), the third line should have a Γ instead of the blurred symbol:

suffice. Furthermore, we take $\Gamma \stackrel{\text{def}}{=} \partial A \cap \partial B$ to be smooth, since one

The equation at the bottom of the page has a blurred minus sign and is missing Γ's. It should read:

$$d(x) = \begin{cases} -\text{dist}\,(x, \Gamma) & \text{if } x \in A, \\ \text{dist}\,(x, \Gamma) & \text{if } x \in B, \end{cases}$$

5. Page 803. The first line is missing a Γ, as is Equation 18:

where "dist" refers to Euclidean distance. Near Γ, d will be smooth

$$|\nabla d(x)| = 1, \; \lim_{s \to 0} \mathcal{H}^{n-1}\{x : d(x) = s\} = \mathcal{H}^{n-1}(\Gamma) = \text{Per}_\Omega \mathbf{A}, \tag{18}$$

The line after Equation 18 and the equation following have blurred symbols instead of minus signs. They read, respectively:

where $\mathcal{H}^{n-1}$ denotes $(n-1)$-dimensional Hausdorf measure.

$$\rho_\varepsilon(x) = \begin{cases} \zeta\left(\frac{-1}{\sqrt{\varepsilon}}\right) & \text{if } d(x) < -\sqrt{\varepsilon}, \\ \zeta\left(\frac{d(x)}{\varepsilon}\right) & \text{if } |d(x)| \le \sqrt{\varepsilon}, \\ \zeta\left(\frac{1}{\sqrt{\varepsilon}}\right) & \text{if } d(x) > \sqrt{\varepsilon}. \end{cases}$$

The equation after the line beginning "Using (15), (18) and the co-area" has blurred symbols for minus signs. It reads:

$$\begin{aligned} \overline{\lim}\, F_\varepsilon(\rho_\varepsilon) &= \overline{\lim}\, \frac{1}{\varepsilon} \int_{\{|d(x)|<\sqrt{\varepsilon}\}} W\left(\zeta\left(\frac{d(x)}{\varepsilon}\right)\right) + \left|\zeta'\left(\frac{d(x)}{\varepsilon}\right)\right|^2 dx \\ &= \overline{\lim}\, \frac{1}{\varepsilon} \int_{-\sqrt{\varepsilon}}^{\sqrt{\varepsilon}} \left[W\left(\zeta\left(\frac{s}{\varepsilon}\right)\right) + \left|\zeta'\left(\frac{s}{\varepsilon}\right)\right|^2\right] \mathcal{H}^{n-1}\{x : d(x) = s\} ds \\ &= \overline{\lim} \int_{-1/\sqrt{\varepsilon}}^{1/\sqrt{\varepsilon}} [W(\zeta(\tau)) + |\zeta'(\tau)|^2] \mathcal{H}^{n-1}\{x : d(x) = \varepsilon\tau\}\, d\tau \\ &\le 2g(\mathbf{b}) \left(\overline{\lim} \max_{|s|\le\sqrt{\varepsilon}} \mathcal{H}^{n-1}\{x : d(x) = s\}\right) = F_0(v_0). \end{aligned}$$

6. Page 805. Figure 1 is missing a symbol and should appear as below:

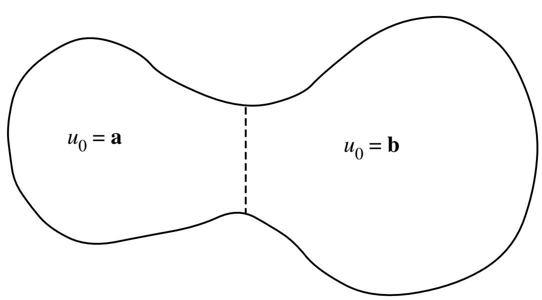

Figure 1. A domain Ω for which F_o possesses an isolated local minimizer u_o.

7. Page 806. In Equations (19) and (20) minus signs should replace the "square dots". They are, respectively:

$$\dot\lambda^\delta \le \frac{-a_1\dot R^\delta}{a_2 R^\delta+\delta}\lambda^\delta + a_3 \quad \text{for } \lambda^\delta \text{ restricted to } \{s : 0 \le \lambda^\delta(s') \le 1 \text{ for all } s' \in [0,s]\}, \tag{19}$$

$$\dot\lambda^\delta \ge \frac{-a_1\dot R^\delta}{a_2 R^\delta+\delta}\lambda^\delta - a_3 \quad \text{for } \lambda^\delta \text{ restricted to } \{s : -1 \le \lambda^\delta(s') \le 0 \text{ for all } s' \in [0,s]\}, \tag{20}$$

The equation at the bottom of the page has blurred symbols for minus signs and should read:

$$2g(\mathbf{b}) = 2\int_{-\infty}^{\infty} \sqrt{W(\zeta(\tau))}|\zeta'(\tau)|\,d\tau = \int_{-\infty}^{\infty} W(\zeta(\tau)) + |\zeta'(\tau)|^2\,d\tau.$$

8. Page 807. The equation at the top of the page has blurred symbols for minus signs and should read:

$$\inf_{\substack{\gamma(-\infty)=\mathbf{a}\\ \gamma(\infty)=\mathbf{b}}} \int_{-\infty}^{\infty} W(\gamma(t)) + |\gamma'(t)|^2\,dt,$$

In *Remarks* (2), the second line is missing a Γ and should read:

work of Fonseca and Tartar [**3**] who establish Γ-convergence without

17. "SINGULAR LIMITS IN FREE BOUNDARY PROBLEMS."

By Andrew Stuart.

1. Page 809. Equation (1) has a blurred symbol for the minus sign. It should read:

$$D\underline{u} + \mu H(\underline{a}\cdot\underline{u} - 1)\underline{f}(\underline{u}) = 0 \quad \text{in } \Omega \subseteq \Re^N, \tag{1}$$

18. "SOLUTIONS OF A NONLINEAR BOUNDARY LAYER PROBLEM ARISING IN PHYSICAL OCEANOGRAPHY."

By William C. Troy.

1. Page 814. In **Theorem 1** *iii*, lines two and three have a blurred symbols for the minus signs and should read:

uniformly for $x \in [0, \infty)$, *and* $\phi_0 = 1 - (e^{-x/2}/\sqrt{3})\sin(\sqrt{3}x/2) - e^{-x/2}\cos(\sqrt{3}x/2)$;

2. Page 815. In **Theorem 1** *iv*, line two has a blurred symbol for the minus signs and should read:

uniformly for $0 \le x \le \infty$, $\phi_1 = 1 + e^{-x/2}((1/\sqrt{3})\sin(\sqrt{3}/2x) -$

3. Page 816. Equations (5), (6) and (8) have blurred symbols for minus signs and should read, respectively:

$$u''' + \lambda u'' - u + \lambda(uu'' - (u')^2) = 0. \tag{5}$$

$$u(0) = -1, \qquad u'(0) = 0 \tag{6}$$

$$u'''(0) = -1. \tag{8}$$

4. Page 819. The last line in the *Proof* has blurred symbols for minus signs and should read:

that $u(1)e^{\gamma(n-1)} < u(\eta) < u(1)e^{r_1(\eta-1)}$ $\forall \eta \ge 1$ and the lemma follows.

5. Page 820. The last displayed equation has blurred symbols for minus signs and should read:

$$u(1)e^{\gamma(n-1)} < u(\eta) < u(1)e^{r_1(\eta-1)} \qquad \forall \eta > \eta_1.$$

19. "ON THE VORTEX SOLUTIONS OF SOME NONLINEAR SCALAR FIELD EQUATIONS."

By Michael I. Weinstein.

1. Page 822. Equation (7) has a square dot for a minus sign and it should read:

$$j(f) = \frac{1}{2}\left(|f_r|^2 + \frac{n^2}{r^2}|f|^2\right) + \frac{1}{4}(1-|f|^2)^2 \tag{7}$$

2. Page 823. Equations (10b), (10d) and (10e) have blurred symbols for minus signs. They should read, respectively:

(10b)

$$r^2U^R(r)^2 + \int_0^r [1-U^R(s)^2]^2 s\,ds = n^2U^R(r)^2 + r^2[1-U^R(r)^2]^2$$

$$\int_0^R [1-U^R(s)^2]^2 s\,ds \le n^2 \tag{10d}$$

$$[1-U^R(r)^2]^2 \le \frac{2n^2}{r}. \tag{10e}$$

Lines two, and six and seven in *Proof} have blurred symbols for minus signs and read, respectively:*

$(L^R + r^{-2})w = 2n^2r^{-3}U^R$, *where* $L^R = -\Delta - 1 + 3(U^R)^2 + n^2r^{-2}$
$\exp(-Ht)$, *where* $H = L^R + r^{-2}$, *is a positivity preserving semigroup and that* $H^{-1} = \int_0^\infty \exp(-Ht)\,dt$ *is then also positivity preserving (see*

3. Page 824. In the last paragraph the first four lines have faint minus signs. They should read:

First, note that d *satisfies the equation* $-\Delta d - d + n^2/r^2 d + g^3 - v^3 = (1-\theta^{-2})g^3$. *By the convexity of the function* $f(s) = s^3$, $g^3 - v^3 \le 3g^2(g-v)$, *and, therefore,* $L(\theta)d \ge (1-\theta^{-2})g^3 > 0$. *Here,* $L(\theta) = -\Delta - 1 + 3\theta^2U^2 + n^2r^{-2} \ge L(1)$, *since* $\theta > 1$. *Now* $L(1)$ *is*

4. Page 825. In Section **3.** *, line two has a faint minus sign. It should read:*

$e(\psi) = 1/2|\nabla\psi|^2 + 1/4\ (1-|\psi|^2)^2$. *It is easily checked formally that*

Equation (11) has a faint minus sign and should read:

$$\mathcal{E}_n[f] = \int [e(f) - e(U(\cdot,n))]r\,dr. \tag{11}$$

In Outline of the Proof the second line has a faint minus sign and should read:

$\int_{|x|<R}[e(g) - e(U(\cdot,n))]r\,dr \geq 0$. *The result can be obtained introducing*

5. Page 826. In the first paragraph in line seven, there are faint minus signs. The line should be:

behavior: $l_{11} \sim -\Delta$ *and* $l_{22} \sim \Delta - 2$. *Therefore, the continuous*

20. "CLOSED SUBALGEBRAS OF THE BANACH ALGEBRA OF CONTINUOUSLY DIFFERENTIABLE FUNCTIONS ON AN INTERVAL."

By Philip Downum and John A. Lindberg, Jr.

1. Page 834. In the first Proof , lines three and six are missing minus signs and should read, respectively:

is inverse-closed on I. *From the formula* $(1/g)'(x) = -g'(x)/g(x)^2, x \in$
both hold so that $(-g'(x)/g(x)^2)f'(y) = (-g'(y)/g(y)^2)f'(x)$. *Thus,*

In the last paragraph lines four through eight, ten, twelve and thirteen are missing minus signs. The lines should read, respectively:

$h_z \in A_f$ *such that* $h_z' \equiv g'$ *on* $f^{-1}(z)$. *If* $f^{-1}(z) \subset S_f$, *then we take* $h_z \equiv 0$. *Then* $h_z' \equiv g'$ *on* $f^{-1}(z)$ *since* $g \in B_f$ *implies* g' *is zero whenever* f' *is zero. If* $f^{-1}(z) \not\subset S_f$, *then let* $x \in f^{-1}(z) \backslash S_f$. *Then* $f'(x) \neq 0$. *Define* h_z *by* $h_z' = (g'(x)/f'(x))f'$. *Clearly* $h_z \in A_f$. *If*
$y \in f^{-1}(z)$, *then* $f(x) = f(y)$ *so that* $g'(x)f'(y) = g'(y)f'(x)$. *Since*
there exists $h_z \in A_f$ *such that* $h_z' \equiv g'$ *on* $f^{-1}(z)$. *Let* $\epsilon > 0$ *be*
$f^{-1}(z) \subset W_z$ *and hence there exists an open neighborhood* V_z *(in* $f(I)$*)*
of z *such that* $f^{-1}(V_z) \subset W_z$. *Since* $f(I)$ *is compact, there are points*

2. Page 835. The first equation is missing minus signs and should *read:*

$$|h'(x) - g'(x)| = \left|\sum_{i=1}^{n} u_i(f(x))[h'_{z_i}(x) - g'(x)]\right|$$
$$\leq \sum_{i=1}^{n}[u_i(f(x))|h'_{z_i}(x) - g'(x)|]$$
$$\leq \left[\sum_{i=1}^{n} u_i(f(x))\right] \cdot \epsilon = \epsilon,$$

The two lines after the equation are missing minus signs and should read:

since $|h'_{z_i} - g'| < \epsilon$ *on* f^{-1} *(supp* u_i*),* $i = 1, 2, \ldots, n$*, implies that* $0 \leq u_i(f)|h'_{z_i} - g'| \leq u_i(f) \cdot \epsilon$*. It follows that* $g' \in A'_f$ *since* A'_f

3. Page 836. The last line in the paragraph beginning "As we will see ... " is missing a minus sign:

and $|f - f(a)|$*, where* $I = [a, b]$*.*

4. Page 837. In the Proof line eight is missing minus signs and should read:

inverse $f_i^{-1} : N \to N_i$*. Let* $\psi(x) = f_2^{-1}(f_1(x)), x \in N_1$ *Then* ψ *is*

5. Page 838. In the paragraph beginning "Now, suppose that ... ," lines four, six, seven, and ten are missing minus signs and the equation following as well. They read, respectively:

are both positive. We will show that $g = |f - f(0)|$ *is in* $A^{R_f} \cap A_{S_f}$
all $t \in V$*, then* $g \equiv f - f(0)$ *on* V *so that* $g' \equiv f'$ *on* V*. Similarly, if* $f(t) \leq f(0)$ *holds for all* $t \in V$*, then* $g' \equiv -f'$ *on* V*. In either case,* g *is*
set containing the endpoints of I *and* $g'(0) = f'(0), g'(1) = -f'(1)$*. To*

$$\left|\frac{g(x_0 + h) - g(x_0)}{h}\right| = \left|\frac{f(x_0 + h) - f(x_0)}{h}\right| \to |f'(x_0)| = 0.$$

6. Page 839. In the first line a minus sign is missing and it should read:

$g'(0) = f'(0), g'(1) = -f'(1)$ and $f'(0), f'(1)$ are both positive, it

In **Corollary 2.7** *line two is missing a minus sign:*

then $A^{R_f} \cap A_{S_f} = A_f \oplus \mathbf{C} \cdot |f - f(0)|$. Moreover, there exists a continuous

In the Proof lines four and six are missing minus signs and should read, respectively:

Now, set $h_0 = f + |f|$ and $h_1 = f - |f|$. Then $h_0, h_1 \in A_f \oplus \mathbf{C}|f|$.
$g \in A^{R_f} \cap A_{S_f}$, then set $h = g - (g'(0)/2f'(0))h_0 - (g'(1)/2f'(1))h_1$.

In the following paragraph, lines one and four are missing minus signs and should read, respectively:

To prove the second assertion of the corollary, let $d(g) = f'(0g'(1)-$
$A^{R_f} \cap A_{S_f}$. Moreover, $d(f) = 0$ and $d(|f|) = -2f'(0)f'(1)$ so that

In the last paragraph, lines two, seven and eight, and eleven are missing minus signs and should read, respectively:

2.6. Let $I = [-1, 1]$ for convenience. Suppose that $f \in D^1(I)$ is
set of even functions on I. On the other hand, $f'(-1) = -f'(1)$ so
that $f'(-1)f'(1) < 0$ and hence, $A_f = A^{R_f} \cap A_{S_f}$.
that f is one-to-one on $[-1, 0]$ and retain the hypotheses that f is even

7. Page 840. The last line on the page is missing a minus sign and should read:

$1 \leq j \leq n, f^{-1}(f(I_1)) = \cup_{j=1}^{n} I_j$ and $f(I_1)$ is a neighborhood of z.

8. Page 841. In the paragraph beginning "Let Γ be a circle ... ," the third line should have braces instead of brackets and should read:

and let $\{t_1, t_2\} = \Gamma \cap \mathbf{R}$. We further require that h satisfy

9. Page 842. The first and second equations are missing minus signs and should read, respectively:

$$\left| \frac{1}{2\pi i} \int_{\mathrm{Bdy}(G_k)} \frac{h(\zeta)}{\zeta - z} d\zeta - \sigma_k(z) \right| < (2k)^{-1},$$

$$\sigma_k(z) = \frac{1}{2\pi i} \sum_{j=1}^{N_k} \frac{\tilde{h}(\zeta_j^{(k)})(\zeta_j^{(k)} - \zeta_{j-1}^{(k)})}{\zeta_j^{(k)} - z}.$$

The first line in the paragraph beginning "Since $\mathbf{C}$ *. . . ," is missing a* Γ *and should read:*

Since $\mathbf{C}\backslash(\Gamma \cup [t_1, t_2])$ *has exactly two bounded components,* $\mathbf{C}\backslash(\gamma\cup$

The next paragraph beginning "Now, let Γ *. . . ," is missing* Γ*'s in the first and second line and should read:*

Now, let $\Gamma_1 = \{z \in \Gamma : \operatorname{Im} z \geq 0\}$ *and* $\Gamma_2 = \{z \in \Gamma : \operatorname{Im} z \leq 0\}$*.*
If $\gamma_j = \delta(\Gamma_j) \cup f([t_1, t_2])$*, then* γ_j *is a simple closed curve (with the*

The line third from the equation at the bottom of the page beginning "To see this . . . ," is missing a Γ *and should read:*

To see this, first recall that $\tilde{h} \equiv 0$ *on* $\delta(\Gamma_j)$ *and that* $\gamma_j = \delta(\Gamma_j)\cup$

10. Page 843. The second line at the top of the page should have a Γ *instead of* $[t_1, t_2]$ *and should read:*

$X = f(I) \cup \delta([\Gamma])$ *so that* $\tau_k \to \tilde{h}$ *uniformly on* $\gamma_j, j = 1, 2$*. Hence,*

11. Page 845. The line second from the bottom of the page in Proof has a blurred symbol for a minus sign. It should read:

$f_n g_n^{-1} \in [A, H_A]$ *such that* $\|f_n g_n^{-1} - f\|_1 \to 0$ *as* $n \to \infty$*. Since* f

12. Page 846. In the last paragraph line eight has a blurred symbol for a minus sign. It should read:

that $\pi_{Q_A}^{A^R}$ *is* $1-1$*, let* $\phi_i = \pi_{A^R}(x_i), i = 1, 2,$ *satisfy* $\phi_1|A = \phi_2|A$*. Then*

13. Page 847. In the last paragraph the last line has a blurred symbol for a minus sign. It should read:

closed neighborhood (in I*) of* $x, N \cap S_f = \varnothing$*, and* f *is* $1-1$ *on* N*. Then,*

14. Page 848. The first line of the first paragraph has a blurred symbol for a minus sign and should read:

by Proposition 1.3, $f_N = f|N$ *is a generator for* $D^1(N)$ *since* f_N *is* $1-1$

15. Page 850. In the first paragraph line five is missing a minus sign and should read:

the n^{th} *derived set* S_n *of* S *is defined to be* S'_{n-1} *for* $n \geq 2, S_1 = S'$

Line (b) in the Proof has a blurred symbol for a minus sign and reads:

(b) $\int_{a_n}^{b_n} h_n(t)dt = g(b_n) - g(a_n)$*; and*

In the last paragraph, lines two through four have blurred symbols for minus signs and these lines should read:

exists $\delta > 0$ *such that* $t, s \in I, |t-s| < \delta$ *imply that* $|g'(t) - g'(s)| < \epsilon$*. Since* $\sum_{n=1}^{\infty}(b_n - a_n) \leq b - a$*, there exists* N *such that* $n \geq N$ *implies* $b_n - a_n < \delta$*. Thus, for* $n \geq N$*,* $\|g'\|_{\overline{I}_n} < |g'(a_n)| + \epsilon$*, and it follows that,*

16. Page 851. In the displayed equation starting with $g(s)$ *there is a missing minus sign. It should read:*

$$\begin{aligned} g(s) - g(a) &= \int_a^s g'(t)dt = \int_J g'd\mu = \sum_{b_n \leq s} \int_{I_n^0} g'd\mu \\ &= \sum_{b_n \leq s} \int_{I_n^0} hd\mu = \int_J hd\mu = \int_a^s h(t)dt = f(s) - g(a). \end{aligned}$$

17. Page 852. The second line has a blurred symbol for a minus sign, as does the first and second displayed equations. They should read, respectively:

where $n = \mathcal{I}(f, A_S) - 1$*. Moreover,* $D^1(I)$ *is integral over* A_S *and*

$$g_k = \frac{(n+1)!}{(k+1)!} f^{k+1} + \frac{n!}{k!}\alpha_0 f^k + \cdots + (n-k)!\alpha_k$$

$$h_k = \frac{(n+1)!}{(k+2)!} f^{k+2} + \frac{n!}{(k+1)!}\alpha_0 f^{k+1} + \cdots + (n-k)!\alpha_k f$$

The third displayed equation has a small "dot" for a minus sign and should read:

$$h_k' = g_k f' + \frac{n! f^{k+1}}{(k+1)!}\alpha_0' + \cdots + (n-k)! f \alpha_k'$$

Lines one through six following this equation have blurred symbols for minus signs and should read:

is identically zero on S_{n-k-1}. *By Lemma 5.1, there exists* $\alpha_{k+1} \in A_S$ *such that* $g_{k+1} = h_k + (n-k-1)!\alpha_{k+1}$ *is identically zero on* S_{n-k-2}. *Hence, by mathematical induction, there are functions* $\alpha_0, \ldots, \alpha_n - 1 \in A_S$ *such that* $g_{n-1} = (n+1)f^n + n\alpha_0 f^{n-1} + \cdots + \alpha_{n-1}$ *is identically zero on* $S_{n-(n-1)-1} = S_0 = S$. *Consequently,* $\alpha_n = -f^{n+1} - \alpha_0 f^n - \cdots - \alpha_{n-1} f$ *belongs to* A_S *since* $\alpha'_n = -g_{n-1}f' - \alpha'_0 f^n - \cdots - \alpha'_{n-1} f$.

The last two lines in the last paragraph have blurred symbols for minus signs and should read:

$\beta_i \in A_S, i = 1, 2, \ldots, n$. *Now, suppose* $\beta^{(k)}(f) \equiv 0$ *on* S_{k-1}. *Then* $\beta^{(k)}(f)' = \beta^{(k+1)}(f)f' + \sum_{i=k}^{n} \frac{i!}{(i-k)!}\beta'_i f^{i-k}$ *is identically zero on* S_k

18. Page 852. The first line has a blurred minus sign and should read:

since $S_k = (S_{k-1})'$, *and it follows that* $\beta^{(k+1)}(f) \equiv 0$ *on* S_k. *Thus, by*

19. Page 853. In the Appendix *line six has a blurred minus sign and should read:*

at $z = 1 : f(I) = \{|z| = 1\} \cup \{|z - 1/2| = 1/2\}$. *The carrier space*

21. "THE DIAGONAL ENTRIES OF A HILBERT SPACE OPERATOR."

By Domingo A. Herrero.

1. Page 858. In **Theorem** *(iii), the third line is missing minus signs and should read:*

respect to this basis, and $|a_n - a'_n| \to 0$ $(n \to \infty)$.

Lines two through four in the Proof of the Theorem at the bottom of the page are missing minus signs and should read:

$\{g_n\}_{n=1}^{\infty}$ *be an ONB of* $\mathcal{H}$. *Suppose* $\{\lambda \in \mathbf{C} : |\lambda - a| < \varepsilon\} \subset W_e(T)^0$. *If* $a_n = a$ *for infinitely many a's, we can find* $b \in W_e(T)^0$, $|a - b| < \varepsilon$, *and* m_1 *such that* $(m_1 - 1)b + \langle Tg_1, g_1\rangle = m_1 a$. *By Lemma 2(ii) we can*

2. Page 859. Line three in the paragraph beginning "If $a_n = a \ldots$ *," is missing a minus sign and should read:*

$\langle Te'_j, e'_j \rangle = a_{n(j)}$, *where* $|a - a_{n(j)}| < \varepsilon$ $(j = 1, 2, \ldots, m_1)$.

The last line on the page is missing a minus sign and should read:

$|a'_n - a_n|$. *Since* $\{a_n\}_{n=1}^{\infty}$ *only accumulates on* $W_e(T)$, *it readily follows*

3. Page 860. Line one and the matrix are missing minus signs and should read:

that $|a_n - a'_n| \to 0$ $(n \to \infty)$, *and therefore the operator*

$$K = \begin{pmatrix} a_1 - a'_1 & & & & & & & \\ & a_2 - a'_2 & & & & & & \\ & & \cdot & & \mathbf{O} & & & \\ & & & \cdot & & & & \\ & & & & \cdot & & & \\ & \mathbf{O} & & & & a_n - a'_n & & \\ & & & & & & \cdot & \\ & & & & & & & \cdot \end{pmatrix} \begin{matrix} e_1 \\ e_2 \\ \cdot \\ \cdot \\ \cdot \\ e_n \\ \cdot \\ \cdot \end{matrix}$$

The second line in the paragraph beginning "Since $a_n \in W_e(T)$ *. . . ," is missing a minus sign and should read:*

a'_n, $|a'_n - a_n| < \varepsilon$ $(1 \leq n \leq n(m_1))$, $e_{n(j)} = e'_j$ *and* $a'_{n(j)} = b_j$

The last line on the page is missing a minus sign and should read:

$$|a_n - a'_n| < \varepsilon/2^k \quad \textit{for } n(m_k) < n \leq n(m_{k+1}),\ k = 1, 2, \ldots .$$

4. Page 861. The first line and the matrix after it are missing minus signs and should read:

Since $a_n - a'_n \to 0$ $(n \to \infty)$, *the operator*

$$K = \begin{pmatrix} a_1 - a'_1 & & & & & & \\ & a_2 - a'_2 & & & & & \\ & & \cdot & & \mathbf{O} & & \\ & & & \cdot & & & \\ & & & & \cdot & & \\ & & \mathbf{O} & & & a_n - a'_n & \\ & & & & & & \cdot \\ & & & & & & & \cdot \end{pmatrix} \begin{matrix} e_1 \\ e_2 \\ \cdot \\ \cdot \\ \cdot \\ e_n \\ \cdot \\ \cdot \end{matrix}$$

The second line in the last paragraph and the displayed equation after are missing minus signs. They should read, respectively:

b_{n-1}, *so that* $\langle Be_j, e_j\rangle = b_j$ $(j = 1, 2, \ldots, n)$, *and* $b_{j+1} \in W(B_j)$,

$$b_n = \ trace(B) - \sum_{j=1}^{n-1} b_j.$$

5. Page 862. The two lines between the two matrices are missing minus signs and should read:

then $Sf_n = a_n f_n + r_n$, *where* $r_n \perp f_n$, $||r_n|| = ||Sf_n - a_n f_n|| =$ $(1 - |a_n|^2)^{1/2}$ *(because* S *is an isometry), whence it readily follows that*

6. Page 863. At the top of the page minus signs are missing in the displayed equation. It should read:

$$||K|| \leq |K|_{H-S} = \left(\sum_{n=1}^{\infty} ||r_n||^2\right)^{1/2} = \left(\sum_{n=1}^{\infty} [1 - |a_n|^2]\right)^{1/2}$$
$$< \sqrt{2}\left(\sum_{n=1}^{\infty} [1 - |a_n|^2]\right)^{1/2} < \infty.$$

22. "INFINITESIMALLY GENERATED SUBSEMIGROUPS OF MOTION GROUPS."

By J. Hilgert.

1. Page 867. In the paragraph beginning "Let W be a wedge $\dots$," lines two and three are missing minus signs and should read:

$T_x = (W - \mathbf{R}^+x)^- \cap (\mathbf{R}^+x - W)^-$ *(cf. [**5**]). A closer inspection of the definition of T_x yields (cf. [**5**]) that we may call T_x the tangent space*

In Section **1.** *, lines ten and fifteen are missing a minus sign and should read, respectively:*

(i.e., satisfies $K \cap -K = \{0\}$). For a proof of the generalization we refer if $W_1 \backslash (W_1 \cap -W_1)$ is contained in the interior of W_2.

The last line is missing a minus sign:

generating in $\underline{L}(G) = L$. If K is a cone (i.e., $K \cap -K = \{0\}$) in

2. Page 868. In Proof , line six is missing a minus sign and lines ten through twelve have blurred symbols for minus signs. They should read, respectively:

$t \in [-\epsilon, \epsilon]$. Making ϵ and B_0 smaller if necessary, we may assume by $\exp(K' \cap B_0) \cap S^{-1} = \{\mathbf{1}\}$. *In fact* $\exp(K') \subset S$ *and* $S \cap S^{-1}$

*is a Lie subgroup with $\underline{L}(S \cap S^{-1}) = W \cap (-W)$ by [**12**]. Hence* $\exp^{-1}(\exp(K' \cap B_0) \cap S^{-1} \subset W \cap (-W) \cap K' = \{0\}$.

In the paragraph starting "Note that the uniform $\dots$ " lines seven and eight are missing or have blurred minus signs and should read:

may find an $\epsilon_1 > 0$ such that $-\epsilon_1 x_0 * ((K' \cap \overline{B}_1) \backslash B_2)$ is still contained in int$(W \cap B_0)$. But we may assume that $\epsilon_1 < \epsilon$ so that $\phi_{-\epsilon_1}$ is a

The first line of the equation following this paragraph has blurred minus signs and should read:

$$(K' \cap B_1) \backslash B_2 = \phi^{-1}_{-\epsilon_1}(- \in_1 x_0 * (K' \cap B_1) \backslash B_2) \subseteq \phi^{-1}_{-\epsilon_1}(W \cap B_0)$$

3. Page 873. Lines ten and eleven in Proof are missing minus signs and should read:

by the minimality of L *we know that* $(W+\mathbf{R}\,y)^-/\mathbf{R}\,y$ *is invariant in* $L/\mathbf{R}\,y$*, hence we know also that* $(W+\mathbf{R}\,y)^-$ *is invariant in* L*. There*

Line two in Case 1. is missing a minus sign and should read:

$(W+\mathbf{R}\,y)^-$ *so that by [**7**] we have* $[x,L]\in T_x$*.*

4. Page 874. In **Proposition 3.1.** *, line six is missing a minus sign and should read:*

identity then $\underline{L}\,(q^{-1}(T))=(L(q))^{-1}\underline{L}\,(T)$*.*

In the paragraph beginning "To see the last . . . ," lines two through eleven are missing minus signs and should read:

as a group since T *generates* H *and* $\ker q\subset q^{-1}(T)$ *so that* $\underline{L}\,(q^{-1}(T))$ *makes sense. Moreover* $q(q^{-1}(T)=T$ *so that the inclusion* $\underline{L}\,(q^{-1}(T))\subset L(q)^{-1}\underline{L}\,(T)$ *follows from the first part. Conversely if* $x\in L(q)^{-1}(\underline{L}\,(T))$*, then* $\exp_H\mathbf{R}^+L(q)x\subseteq\overline{T}$ *so that* $\exp_G\mathbf{R}^+x\subseteq q^{-1}(\overline{T})$*. But since* H *is metrizable [**1**; Cap. IX,* Sup *2, Prop. 1.8] implies that* $q^{-1}(\overline{T})\subset(q^{-1}(T))^-$*, since any Cauchy sequence in* $\overline{T}$ *can be lifted to a Cauchy sequence in* $q^{-1}(\overline{T})$*. In fact, for any* $s\in q^{-1}(\overline{T})$ *we find a sequence* h_n *in* T *converging to* $q(s)$ *and hence a sequence* $s_n\in q^{-1}(h_n)\subseteq q^{-1}(T)$ *converging to* s*, i.e.,* $s\in(q^{-1}(T))^-$*. Thus* $\exp_G\mathbf{R}^+x\subseteq(q^{-1}(T))^-$ *or, by (0.3),* $x\in\underline{L}\,(q^{-1}(T))$*.* □

5. Page 875. In the first Proof , line five is missing a minus sign and should read:

the identity. Thus Proposition 3.1 implies that $q^{-1}(\overline{T})$ *is a semigroup*

In the Proof following **Lemma 3.3** *, lines two and three are missing minus signs and should read:*

$\exp x\in S$ *since* $\underline{L}\,(S)=\underline{L}\,(\overline{S})$*. Since* $(\exp\mathbf{R}\,x)^-$ *is compact, this implies* $(\exp\mathbf{R}\,x)^-\subset\overline{S}$ *so that* $\mathbf{R}\,x\subset W$*, whence* $x=0$*.*

23. "BOUNDS ON THE ORDER OF GENERATION OF $SO(n,R)$ *BY ONE-PARAMETER SUBGROUPS."*

By F. Silva Leite.

1. Page 881. In the equation after the paragraph beginning "Now a canonical . . . ," in the second line after, and in the following equation, minus signs are missing. They should read, respectively:

$$[A_{ij}]_{kl} = \begin{cases} \delta_{ik}\delta_{jl}, & 1 \le k \le l \le n, \\ -\delta_{il}\delta_{jk}, & 1 \le l \le k \le n, \end{cases}$$

relations $([A, B] = AB - BA)$

$$[A_{ij}, A_{kl}] = \delta_{jk}A_{il} + \delta_{il}A_{jk} - \delta_{ik}A_{jl} - \delta_{jl}A_{ik}.$$

2. Page 882. In the paragraph beginning "Let M be and R.S. manifold . . . ," line nine is missing a minus sign and should read:

and $\mathcal{P} = \{X \in \Gamma : (d\sigma)_e X = -X\}$. *Since* $(d\sigma)_e$ *is an automorphism,*

3. Page 884. In the first, second and fourth equation at the top of the page, minus signs are missing. They should read, respectively:

$$\underset{p \ge q \ge 1}{\Gamma = so(p+q) =} \left\{ \begin{pmatrix} X_1 X_2 \\ -X_2^t X_3 \end{pmatrix}; \begin{array}{l} X_1 \in so(p),\ X_3 \in so(q) \\ X_2 \ arbitrary \end{array} \right\}$$

$$(*) \qquad \sigma(X) = I_{p,q} X I_{p,q}, \qquad I_{p,q} = \begin{pmatrix} -I_p & 0 \\ 0 & I_q \end{pmatrix}$$

$$\mathcal{P} = \left\{ \begin{pmatrix} 0 & X_2 \\ -X_2^t & 0 \end{pmatrix}, \ X_2 \ arbitrary \right\}$$

4. Page 886. In **Lemma 2.4.** *, lines five and six have blurred symbols for minus signs and should read:*

with $p = m_1 - 2$, $q = 2$ *and* $SO(m)$, $\forall m \in [3, n] \cap (\mathbf{Z} \backslash \{m_1\})$ *is decomposed with* $p = m - 1$, $q = 1$

.

In the first Proof , lines two through five and line seven have blurred symbols for minus signs and should read:

$SO(n) = KAK$ *with* $K = SO(n-2) \times SO(2)$ *and* A *two-dimensional.*

Now if, $\forall i \in [2, n-3] \cap \mathbf{Z}$, $SO(n-i)$ *is decomposed as* $SO(n-i) = K_i A_i K_i$ *with* $K_i = SO(n-(i+1))$ *and* A_i *one-dimensional, by Lemma 2.3 the corresponding generating set of* $SO(n-2)$ *contains* $n-3$ *the decomposition above contains* $(n-3)+1+2 = n$ *elements. Now*

In the second Proof , lines three through five, seven and eight, and line ten have blurred symbols for minus signs and these lines should read:

we have $SO(n) = SO(n-2) \times SO(2) A SO(n-2) \times SO(2)$, *with* A *a two-dimensional abelian subgroup and hence* $SO(n-2) = K_i A_i K_i A_{i-1} \cdots K_i A_i K_i A_1 K_i A_i K_i \cdots A_{i-1} K_i A_i K_i$ *with* $i = n-4$, *of* $SO(n-2)$, K_i *occurs* 2^i *times and* A_j, $1 \leq j \leq i$ *occurs* 2^{j-1} *times. Thus* $SO(n-2)$ *is a product of* $2^{n-4} + \sum_{j=1}^{n-4} 2^{j-1} = \sum_{j=0}^{n-4} 2^j = 2^{n-3} - 1$ *product of* $2(2^{n-3} - 1 + 1) + 2 = 2^{n-2} + 2$ *one-parameter subgroups.* □

5. Page 892. The fifth line after the second displayed equation has a blurred symbol for a minus sign:

follows.) Now, to each vector $x = (x_1, \ldots, x_m)$, $m = n(n-1)/2$ *of* $\mathbf{R}^m$

The first three lines after the matrix have blurred symbols for minus signs. They should read:

A simple calculation shows that $\forall X, Y \in so(n)$, $\mathrm{trace}\,(XY) = -2(x, y)$ ($(\cdot,\cdot)$ *is the inner product). Then, since* $\langle A, B\rangle = \mathrm{trace}\,(ad\,A \cdot ad\,B) = (n-2)\mathrm{trace}\,(AB)$ *(Helgason [**3**, p. 189]),* $\langle A, B\rangle = -2(n-2)(a, b)$ *and*

6. Page 893. The line before the first displayed equation and the equation have blurred symbols for minus signs. They should read:

Let β_j, $j = 1, \ldots, n-1$ *be defined as before. We use the notation*

$$-[\beta_i, \beta_j] = \{A_{sr} \in \mathcal{B} : A_{rs} \in [\beta_i, \beta_j]\}.$$

In **Lemma 3.2.** *(2), the minus signs are blurred and this line should read:*

(2) $\forall i < j$, $i + j \leq n$, $\beta_{j-1} \subset -[\beta_i, \beta_j]$.

Lines two and three in Proof have blurred symbols for minus signs. They should read:

both n and k have a common divisor m, both n and $n-k$ also have the same divisor m and both β_k and β_{n-k} belong to a proper subalgebra

The last line in the next paragraph beginning "Next we prove ... ," has a blurred minus sign and it should read:

brackets of elements of β_k and β_{n-k}, obviously $[\alpha_k]_{\mathrm{L.A.}} = so(n)$.

The last line of the page has a blurred minus sign and should read:

i.e., $n = j_0 k + k_1$ for some $k_1 \in \{1, \dots, k-1\}$, $j_0 \in \mathbf{N}$. Consider the

7. Page 894. Equation (3.2) has blurred symbols for minus signs and should read:

$$(3.2) \quad \begin{array}{ll} (1) & \beta_{n-2k} \subset -[\beta_k, \beta_{n-k}] \\ (2) & \beta_{n-3k} \subset -[\beta_k, \beta_{n-2k}] \\ \vdots & \vdots \\ (j_0-1) & \beta_{k_1} = \beta_{n-j_0 k} \subset -[\beta_k, \beta_{n-(j_0-1)k}]. \end{array}$$

In the text following Equation (3.2), lines two through four, and line six have blurred symbols for minus signs. They should read, respectively:

and $X_1 \in \beta_{n-k}$ such that $Z_2 = -[X_2, X_1]$. From (2), $\forall Z_3 \in \beta_{n-3k}$ there exist $X_3 \in \beta_k$ and $Y_1 \in \mathcal{B}_{n-2k}$ such that $Z_3 = -[X_3, Y_1]$. But $Y_1 \in \beta_{n-2k}$; thus, $Y_1 = -[X_2, X_1]$ for some $X_2 \in \beta_k$, $X_1 \in \beta_{n-k}$. The same argument used throughout the relations (3), $\dots, (j_0-1)$

Equation (3.3) has a blurred symbol for a minus sign and should read:

$$(3.3) \qquad Z_{j_0} = (-1)^{j_0+1}[X_{j_0}, [X_{j_0-1}, [\dots [X_3, [X_2, X_1]] \dots]]].$$

The first line after Equation (3.3) has blurred symbols for minus signs and should read:

Note that $n - j_0 k = k_1 < k$ and $n - (j_0 - i)k = k_1 + ik > k$, $\forall i \geq 1$.

In the next paragraph starting with "If $k_1 = 1$, then ... ," the third line has a blurred symbol for a minus sign and it should read:

$k \equiv k_2 \bmod k_1$, i.e., $k = j_1 k_1 + k_2$ for some $k_2 \in \{1, \dots, k_1 - 1\}$, $j_1 \in \mathbf{N}$.

Equation (3.4) has blurred symbols for minus signs. It should read:

$$(3.4)\qquad \begin{array}{ll} (1') & \beta_{k-k_1} \subset -[\beta_{k_1}, \beta_k] \\ (2') & \beta_{k-2k_1} \subset -[\beta_{k_1}, \beta_{k-k_1}] \\ \vdots & \vdots \\ (j_1') & \beta_{k_2} = \beta_{k-j_1k_1} \subset -[\beta_{k_1}, \beta_{k-(j_1-1)k_1}]. \end{array}$$

8. Page 895. The first line has a blurred symbol for a minus sign and should read:

such that $Z'_{j_1} = (-1)^{j_1}[X'_{j_1+1}, [X'_{j_1}, [\ldots [X'_3, [X'_2, X'_1]] \ldots]]]$. *Hence,*

The equation following has blurred symbols for minus signs and should read:

$$k - j_1k_1 = k_2 < k_1, \qquad k - (j_1 - i)k_1 = k_2 + ik_1 > k_1, \qquad \forall i \geq 1.$$

Equation (3.5) has blurred symbols for minus signs and should read:

$$(3.5)\qquad \begin{array}{c} \beta_{k_{N-2}-k_{N-1}} \subset -[\beta_{k_{N-1}}, \beta_{k_{N-2}}] \\ \beta_{k_{N-2}-2k_{N-1}} \subset -[\beta_{k_{N-1}}, \beta_{k_{N-2}-k_{N-1}}] \\ \vdots \\ \beta_1 = \beta_{k_N} \subset -[\beta_{k_{N-1}}, \beta_{k_{N-2}-(j_{N-1}-1)k_{N-1}}]. \end{array}$$

9. Page 896. Equation (3.7) and the equation at the bottom of the page have blurred symbols for minus signs and should read:

$$(3.7)\qquad \begin{array}{l} N_k \leq N_{n-ik} < N_{k_1} < N_{k-jk_1} < N_{k_2} < N_{k_1-sk_2} < N_{k_3} < \cdots, \\ \forall i = 1, 2, \ldots, j_0 - 1,\ j = 1, \ldots, j_1 - 1,\ s = 1, \ldots, j_2 - 1, \ldots. \end{array}$$

(3.8)

$$\beta_1 \prec, \ldots, \prec \beta_{k_2} \prec \beta_{k_1-sk_2} \prec \beta_{k_1} \prec \beta_{k-jk_1} \prec \beta_k \prec \beta_{n-ik} \prec \beta_{n-k},$$
$$\forall i = 2, \ldots, j_0 - 1,\ j = 1, \ldots, j_1 - 1,\ s = 1, \ldots, j_2 - 1.$$

10. Page 897. Lines two through four after Figure 3.1 have blurred symbols for minus signs and should read:

$p = m-1$, $q = 1$, the result is a decomposition of $SO(n)$ by one-parameter subgroups A_i, $i = 1, \ldots, n-2$ and K_{n-2} that can be chosen to be generated by $n-1$ canonical basis elements A_{ij_i}, $i = 1, \ldots, n-1$.

11. Page 898. Equation (3.9) has blurred symbols for minus signs and should read:

$$\begin{aligned} &\{A_{i,i+k}, i = 1, \ldots, n-k\} \subset \beta_k, \\ &\{A_{i,i+k_1}, i = n-k+1, \ldots, n-k_1\} \subset \beta_{k_1}, \\ &\{A_{i,i+k_2}, i = n-k_1+1, \ldots, n-k_2\} \subset \beta_{k_2}, \ldots, \\ &\{A_{i,i+1}, i = n-k_{N-1}+1, \ldots, n-2\} \subset \beta_{k_N} = \beta_1, \\ &\{A_{n-1,n}\} \subset \beta_1, \end{aligned} \tag{3.9}$$

In **Theorem 3.3.** *, lines two and three have blurred symbols for minus signs and should read:*

the permutation matrix defined by $P_\Pi e_i = e_{\Pi(i)}$, $i = 1, \ldots, n-1$, $P_\Pi e_n = (-1)^{n+1} e_{\Pi(n)}$, Π the cyclic permutation on n letters and

The equation at the bottom of the page has blurred symbols for minus signs and should read:

$$\Pi_1 = \begin{pmatrix} 1 & 2 & \ldots & n-k & n-k+1 & \ldots & n \\ k+1 & k_2 & \ldots & n & 1 & \ldots & k \end{pmatrix}$$

12. Page 899. Lines four through six have blurred symbols for minus signs and should read:

is defined by $\Pi_C(i) = (i-1)k+1$ if $(i-1)k+1 \leq n$, $\Pi_C(i) = j$ if $(i-1)k+1 \equiv j \bmod n$. Clearly, if P_{Π_C} is a permutation matrix satisfying $P_{\Pi_C} e_i = \alpha_i e_{\Pi_C(i)}$, $\prod_{i=1}^n \alpha_i = 1$ (respectively, -1), if n

13. Page 900. In **Example.** *, line has a blurred symbol for a minus sign. It should read:*

$\exp(\theta A) \exp(tB) \exp(-\theta A)$, *for some θ depending on X, it follows from*

14. Page 901. In the lines after the last displayed equation, line six and the last line both have a blurred symbol for a minus signs. They should read, respectively:

X belongs to $\{A_{24}, A_{35}, A_{17}\}$, $\{A_{46}, A_{57}\}$ or $\{A_{12}, A_{23}, A_{45}, A_{67}\}$, re-
$\exp(tA)\exp(\theta B)\exp(-tA)$, and the final result after composition of

15. Page 903. In the second paragraph of the Appendix, lines one and three are missing minus signs and should read:

When $\psi \in [\pi/2k, \pi/(2k-1))$, $k \geq 2$, a much shorter proof was
$\psi \in [\pi/(2k-1), \pi/(2k-2))$, our result is not as good as Lowenthal's,

16. Page 904. In **The Main Theorem.** *, line three has blurred symbols for minus signs. It should read:*

if $\psi \in [\pi/2(k-1), \pi/2(k-2))$, $k \geq 3$, the order of generation is $2k-1$.

In the next paragraph, line two has blurred symbols for minus signs. It should read:

$\psi \in [\pi/(2k-1), \pi/(2k-2))$; instead, "the number of generation" should

The matrix contains blurred symbols for minus signs and should read:

$$X = \begin{pmatrix} 0 & -x_3 & x_2 \\ x_3 & 0 & -x_1 \\ -x_2 & x_1 & 0 \end{pmatrix},$$

17. Page 905. Figure 4.1 is missing some symbols and should appear as below:

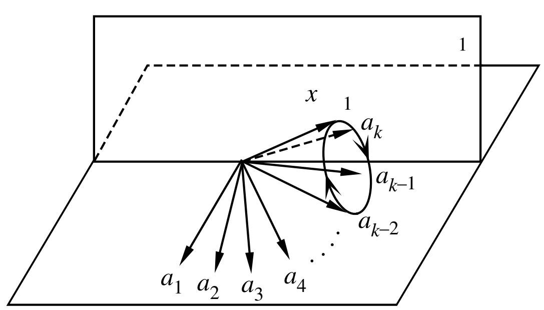

FIGURE 4.1

18. Page 906. Equations (4.2) and (4.3) are missing minus signs *and should read:*

$$\exp(\theta A_i) = \exp(\pi A_{i-1}) \exp(\theta A_{i-2}) \exp(-\pi A_{i-1}), \tag{4.2}$$

$$\exp(\theta X) = \exp(tA_{k-1}) \exp(\theta A_{k-2}) \exp(-tA_{k-1}). \tag{4.3}$$

19. Page 908. In Proof of the Main Theorem.} lines three and four, six and the last line have blurred symbols for minus signs and should read, respectively:

the order of generation is then equal to three. When $\psi \in [\pi/2(k-1), \pi/2(k-2))$ *it was seen that* $\exists\ x \in \mathbf{R}^3$*, x perpendicular to* a_1*,*
$t_i \in \mathbf{R}$*. But* $\exp(t_2 X)$ *can be written as a product of* $2(k-3)+3$
$2(k-3)+3+2 = 2k-1$*,* $\forall k \geq 3$*, which completes the proof.* □

In Remark. line three has a blurred symbol for a minus sign and should read:

ery element of $SO(3)$ *can also be written as a product of* $2k-1$ *elements*

20. Page 909. The last line in **Theorem 4.2.** *has a blurred symbol for a minus sign and should read:*

trajectory of $\{A, B\}$ *in, at most,* $N = k-1$ *switches.*

The equation after the first Proof *has a blurred symbol for a minus sign. It should read:*

$$\forall \theta > 0,\ \exists\ \zeta > 0 :\ \forall X \in so(3),\ \exp(-\theta X) = \exp(\zeta X).$$

In the paragraph after the first Proof *, line five has a blurred symbol for a minus sign and it should read:*

of $\{A, B\}$ *involving at most* $k-1$ *switches. Now, the result follows*