

Corrections of the Book “PME” by Juan Luis Vázquez

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blue color means new version, red color means erased text, [...] means orders or suggestions

Errata and corrections

Chap 1

- page 4, lines -4, -3: the statement is loose. This is a precise version
"HE: A non-negative solution of the heat equation defined in a space-time region $Q = \Omega \times [t_0, t_1]$, which is not identically zero at $t = t_0$, is automatically positive everywhere for $t > t_0$."

Chap 2

- page 20, line -5: [wrong letter]
- " $m = k = \dots$ " [must be] " $\varepsilon = k = \dots$ "
- page 24, line -3: [wrong letter in formula]
 $-(k/\mu)h_x$
- page 25, line 3: [wrong letter in formula]
 $\dots = \rho g k / 2\varepsilon \mu$

Chap 3

- page 42, line 8: [wrong inequality sign] $|w_t| \leq c|u_t|$

Chap 4

- page 61, line 7: [add to sentence] "... $O(t^\beta)$ " [must be] "... $O(t^\beta)$, with $\beta = \alpha/d$."
- page 67, line -10: [erase] "any" in "any p "
- page 71, line -9: "decreasing sequence" [must be] "increasing sequence"
- page 72, line -2: "but they are" [must be] "but they are not"

Chap 5

- page 105, lines -3, -2 [see modified formula]

$$\begin{aligned} \iint_{Q_T} |\nabla \Phi_n(u_n)|^2 dx dt + \int_{\Omega} \Psi_n(u_n(T)) dx + \iint_{Q_T} G_{n,t} u_n dx dt + \iint_{\Omega} u_n(0) G_n(0) dx \\ = \int_{\Omega} \Psi(u_{n,0}) dx + \dots \end{aligned}$$

- page 106, line 11: $\Phi'_n(x, u_n)$ [must be] $\Phi'_n(u_n)$
- page 108, in formula (5.57): " (N/R^2) " [must be] " (NR^2) "

- page 113, line -12: [add] "Then, if for instance $d = 1$, "
- page 114, line -12: "radius $R/2$ " [must be] "radius R "
- page 115, line 3: " $|x| \leq 2R$ " [must be] " $|x| \leq R$ "

Typos or improved text

Chap 1

- page 14, line 5: [wrong word]
- "over most over" [must be] "over most of"

Chap 2

- page 22, formula (2.17): [letter case is wrong]
- formula begins as " $\partial_t \Psi(T) = \dots$ "

Chap 3

- page 34, line 5: [add a dot after] $\partial\Omega$.
- page 36, line 15; [erase red word]
- "... at immediate."
- page 40, lin -3: [replace] $\nabla_w = 0$ by $\nabla w = 0$
- page 43, line 23: [better wording, change] " $\Phi(u)$ " into " $\Phi = \Phi(u)$ "
- page 44, line 16: [change wording]
- "Problem HDP" into "the initial value problem"
- page 46, line 14; [change wording] "CP" into "Cauchy problem"

Chap 4

- page 52, line at Section 1.1 +1: "an role" [must be] "a role"
- page 53, line -5: "is a solution" [must be] "gives a solution"
- page 54, line 10: [erase] "the" before "Chapter"
- page 63, line 2: " U " [must be] " \mathcal{U} "
- page 63, line 7: [erase repeated final words] "in the PME"
- page 66, line at formula (4.4) + 1: after "(4.22)" [insert] ", and $\beta = \alpha/d$."
- page 73, line 2: [erase second instance of] "interesting" (to avoid repetition)
- page 76, line 23: "book of ..." [must be] "books of ..."
- page 77, line 18: "converge" [must be] "convergence"

Chap 5

- page 97, line 8: "which forces ..." [must be] "and this forces ..."
- page 97, line 9: "will ..." [must be] "will be ..."

- page 107, line 5: [erase] ”in a homogeneous medium”
- page 114, line 11: [add comma] ”like extinction, that ”
- page 116, line -13, -12: [modify sentence into] ”mass diffusion, heat propagation and gas flow ...”
- page 119, line 19: [wrong spelling] ”Padrón”
- page 121, line 8: [change a word] ”of the HDP for ...”
- page 121, line 10: [add word] ”(with improved properties...”

References

- page 601, ref [223] original date missing, it is 1863

Index

- page 621: join Bénilan, P., to Bénilan, Ph.
- page 624: join Type II into of Type II

OLD CORRECTIONS

chap 5

page 81, lin 5.1.1 - 3: new capital sigma Σ must be the same type as previous

page107, line -8 $g' \leq 0$ changes to $g' \geq 0$

pag107, line -5 just after with $a(t) > 0$. insert

This implies that $v(R, t) \geq 0$ for all $t > 0$.

and continue

page107, line -5 $v(r, 0) < 0$ changes to $v(r, 0) \geq 0$,

page107, line -5 $v \leq 0$ changes to $v \geq 0$

page 115, line +2 after Remark after Corollary 5.22 : change the position of the word was as follows

... zero for a degenerate parabolic equation was in its day ...

chap 6

page 126, line 13 of text, insert comma before namely

page 135, paragraph 6.2.2 line 6 change formula from

$u_t = \Delta \Phi(u) = \Delta \phi(u) + f$ to $u_t = \Delta \Phi(u) + f$

pag 144, line 5, beginning of line : Q_T changes to Q

pag 149, I think a blank line is needed between the first line (Problems) and the second line (Problem 6.1)

chap 8

pag 190, line 7 : formula $\|[v(t) - u(t)]_+\|$ changes to $\|[v(t) - u(t)]_+\|_1$

chap 9

pag 203, line 12 insert = in formula: $\beta\alpha/d$ changes to $\beta = \alpha/d$

pag 207, paragraph 9.5.3, line 6 : change sentence both a supersolution and a supersolution... into both a supersolution and a subsolution...

pag 210 lines -3 and -4 : some times u must be \mathcal{U} : note the correct lines

$$\mathcal{U}(x - x_0, \tau'; M') \leq u_0(x) \leq \mathcal{U}(x - x_0, \tau; M).$$

By Theorem 9.2 we get $\mathcal{U}(x - x_0, t + \tau'; M') \leq u(x, t) \leq \mathcal{U}(x - x_0, t + \tau; M)$,

pag 213, line 8, insert word as follows

... when $p \geq 2$ is an even integer...

chap 13

page 310, line 5,6,7 after formula (13.1) eliminate whole sentence?

chap 15

page 370, line 1 after second display : second formula $s(0+) \geq$ must have a 0, not the letter O (just as the first)

page 377, revise all L 's

chap 16

page 407, line +5 after formula (16.24) : replace $K = L^\gamma$ by $K = L^{-\gamma}$

page 408, line -1 before paragraph "Heat equation and fast diffusion equation": replace $0 < t < T_1$ by $0 < t < TT_1$.

chap 17

page 442, formula (17.15): replace n by d in the right-hand side of the formula (=before \geq), it must look like the right-hand side of formula (17.14).

page 450, third display, replace last exponent n by d . It must say $= KL^{-d}M$.

page 451, formula (17.46) replace n by d in first fraction. It says

$$\alpha_p = \frac{d}{\dots}$$

chap 18

pag 455. paragraph that begins "We will explore...". line 5, replace u by \mathcal{U} . It must say $\mathcal{U}(x, t; C)$.

page 457, line 3 after Figure 18.1 change Figure 18.1:) into Figure 18.1)

page 458, check long new sentence

page 479, line 4 replace using by . Using

page 493, line -6 replace finite mass, by infinite mass,

page 493, line -5 replace infinite mass, by finite mass,

page 495, line 10 replace case by cases

page 495, lines 11, 12, 13 to be eliminated (they appear again below!)

page 495, line -7 replace sill by still

page 497, line -2 replace (iii) by (ii)

ojo a las paginas 491 a 515

chap 19

page 516, line -2 to "19.6 Various" Replace Aleksandrov's by Aleksandrov's

chap 21

page 554, line -2, -3 replace constant constant by constant
