LIST OF ERRATA FOR THE BOOK "THE CAUCHY PROBLEM IN GENERAL RELATIVITY"

HANS RINGSTRÖM

- The equality $k = |\alpha_1| + \cdots + |\alpha_2|$ on l. -8, p. 9, should read $k = |\alpha_1| + \cdots + |\alpha_l|$.
- The sentence on l. 14, p. 39 begins "Furthermore, $H_{(s)}(\mathbb{R}^n) \subseteq H_{(t)}(\mathbb{R}^n)$ for $s \leq t$". It should begin "Furthermore, $H_{(t)}(\mathbb{R}^n) \subseteq H_{(s)}(\mathbb{R}^n)$ for $s \leq t$".
- The inequality $i \geq N$ on l. -5, p. 24, should read $i \leq N$.
- On l. 3, p. 35, L^p should be replaced by p.
- On l. -1, p. 44, $\|y\|_{Y_{(0)}}$ should be replaced by $\|y_0\|_{Y_{(0)}}$.
- In connection with l. -3, p. 49, a convention concerning notation for constants should be introduced.
- The sentence on p. 51 immediately below equation (6.14) reads "Note that if $q > 2$, then $(\partial_j f)(x_l) \neq 0$ and $x_l \to \xi$ with $(\partial_j f)(\xi) = 0$, then $(\partial_k \phi_j)(x_l) \to 0$". This sentence should read "Note that if $q > 2$, $(\partial_j f)(x_l) \neq 0$ and $x_l \to \xi$ with $(\partial_j f)(\xi) = 0$, then $(\partial_k \phi_j)(x_l) \to 0$".
- The words 'have different signs' appearing on l. -9, p. 53, should be changed to 'have the same sign'.
- The equality $\kappa = 2n$ appearing on l. 1, p. 54, should be changed to $n = 2\kappa$.
- The equation appearing on l. 15, p. 132 which reads

  $$\mathrm{grad} f_1|_p = \beta \left.\frac{\partial}{\partial y^0}\right|_p + \gamma \left.\frac{\partial}{\partial y^1}\right|_p$$

  should read

  $$\mathrm{grad} f_2|_p = \beta \left.\frac{\partial}{\partial y^0}\right|_p + \gamma \left.\frac{\partial}{\partial y^1}\right|_p .$$

- The sentence which begins on l.-8 of p. 173 reads "Note that $\partial_t h_{\mu\nu}|_{t=\tau}$ should be interpreted as a Riemannian metric, a one form and a function, etc." It should read "Note that $\partial_t h_{\mu\nu}|_{t=\tau}$ should be interpreted as a symmetric covariant two tensor field, a one form and a function, etc."
- On l.-17 and l.-18 of p. 174, $\psi_{(i,j,\tau)}$ occurs (twice) where $\psi_{(j,i,\tau)}$ should appear.
- The last part of the sentence which begins on l.-14, p. 178 and reads "By the above, $C(N, N')$ is partially ordered by inclusion of the U's, and every totally ordered subset of $C(N, N')$ has an upper bound" is incorrect; there are certainly totally ordered subsets of $C(N, N')$ which do not have upper bounds. As a consequence, the concept of a spacelike boundary, introduced on p. 178, becomes useless. This has consequences for the definition of φ; cf. l. 7-9 on p. 182. In fact, it is necessary to argue that the boundary of U is spacelike at an appropriate point. This follows by appealing to the following text from the paper of Yvonne Choquet-Bruhat and Robert Geroch (reference [10] in the book; [10, p. 333, l. -10 to l. -3] to be more precise):

  > Let H denote the collection of all points of ∂U which are "non-Hausdorff" in the sense above. The assumption that H is non-empty will lead to a contradiction. Now H is certainly open in ∂U. Furthermore, given any null geodesic in H, its endpoint in ∂U must also be in H, for the corresponding null geodesic in $\partial(\psi(U))$ must have an endpoint in M. It follows from these two properties of H that we may find a point $p' \in H$ and a spacelike 3-surface T' through p' such that $T' - p' \subset U$.

However, as this argument is quite concise, we have decided to present a different proof of the existence of an MGHD in detail elsewhere; cf.
http://www.math.kth.se/∼hansr/errata.

- The third sentence of Definition A.8 on p. 273 reads "The set of $f \in C^\infty(\Omega, \mathbb{R}^k)$ such that there is a compact set $K \subset \Omega$ with $f = 0$ for $f \notin K$ is denoted $C_0^\infty(\Omega, \mathbb{R}^k)$". This sentence should read "The set of $f \in C^\infty(\Omega, \mathbb{R}^k)$ such that there is a compact set $K \subset \Omega$ with $f(x) = 0$ for $x \notin K$ is denoted by $C_0^\infty(\Omega, \mathbb{R}^k)$".

Department of Mathematics, KTH, 100 44 Stockholm, Sweden

E-mail address: hansr@kth.se