Errata of the book "Gravitational Waves. Vol. 2"
Last update: November 1st, 2018.

A. Significant corrections

- In Eq. (10.24), page 29, the factor $(1\,\mathrm{ms}/P_{\rm NS})$ should be $(1\,\mathrm{ms}/P_{\rm NS})^2$.
  (27/08/18. Thanks to Paul Dragulin).

- The statement on page 499 that, in the literature, the error on w has been underestimated, because the degeneracies with the other cosmological parameters were not taken into account, is wrong. The degeneracies with the other parameters is eliminated by including other datasets such as CMB, SNe and BAO, which has been correctly done; see Zhao, Van Den Broeck, Baskaran and Li (2011), *Phys. Rev. D* **83**, 023005, that show that the result of imposing a prior on H_0 and Ω_M from CMB, SNe and BAO is basically equivalent to fixing them at their best-fit value. The rest of the discussion in this part, and in particular the fact that modified GW propagation can give an effect larger than that due to the dark-energy equation of state, remains correct [see also the more recent discussion in Belgacem, Dirian, Foffa and Maggiore (2018), *Phys. Rev. D* **98**, 023510, arXiv:1805.08731].
  (28/3/18).

B. Minor corrections (and some comments)

- Page 22, line 3, "^{2}He" should be "^{4}He"
  (27/08/18. Thanks to Paul Dragulin).

- Page 53, eq. (10.107). I have been asked whether the factor 2/3 is a typo for $2/\sqrt{3}$, coming from setting $M = (4/3)\pi\rho_0 r^3$ in Kepler's law $\Omega_K^2 = GM/r^3$. Actually no, eq.(10.107) is correct as it stands. It is a numerical approximation (not an exact analytic result) that holds for a Newtonian model with a polytrope EoS, see Ipser and Lindblom, *Astrophys. J.*, **355**, 226 (1990) and eq. (1) of Andersson, *Class. Quant. Grav.* **20**, R105 (2003).

- Page 171, one line before Eq. 12.298, "becomes negative" should be "becomes positive."

  (27/08/18. Thanks to Paul Dragulin).

- Fig. 19.20 on page 504. The horizontal bands came out too dark and the 1σ and 2σ contours are undistinguishable. They can be distinguished in the original figure from Belgacem, Dirian, Foffa and Maggiore (2017a).

  (06/04/18)

- Page 215, Eq 14.16, there is a missing minus sign in front of the g_{00} term of the metric.

  (27/08/18. Thanks to Paul Dragulin).

- Page 215, eqs. (14.17)–(14.18), some factors of c are missing: eq. (14.17) should be "$E_2 = c\, g_{\mu\nu}\xi^\mu p_2^\nu$ "; two lines after, "$E_2 = g_{00}p_2^0 = g_{00}m_2u^0$" should be "$E_2 = cg_{00}p_2^0 = cg_{00}m_2u^0$", and eq.(14.18) should be $u_0 = c\,(1 - 3Gm/c^2r)^{-1/2}$.

  (14/09/18. Thanks to Danny Laghi).

- Page 219, 1st line after Eq 14.43, (r, ϕ) should be (ρ, ϕ).

  (27/08/18. Thanks to Paul Dragulin).

- Page 406, top line: both occurrences of a^{-3} should be a^3.

  (27/08/18. Thanks to Paul Dragulin).

- Page 491, 2nd line after Eq 19.296, reference to eq. (19.287) should be to eq. (19.285).

  (27/08/18. Thanks to Paul Dragulin).

- Page 510, 14th line after Eq. 20.11, "$z < z_{\rm dec}$" should be "$z > z_{\rm dec}$".

  (27/08/18. Thanks to Paul Dragulin).

- Page 654, Eq. 22.49: "$\sin m_\phi t$" should be "$\sin^2 m_\phi t$".

  (27/08/18. Thanks to Paul Dragulin).

C. Very minor or obvious typos

- Page iv, a funny typo. “Errrata” should be “Errata”

  (06/04/18. Thanks to my wife Maura...)

- Page 3, note 1, line 4 “SN type” should be “SN types”

  (24/12/18. Thanks to Harvey McArthur).

- Page 4, unnumbered note, line 3. Missing period at the end.

  (24/12/18. Thanks to Harvey McArthur).

- Page 22, line 13 from bottom, “can longer sustain” should be “can no longer sustain”.

  (24/12/18. Thanks to Harvey McArthur).

- Page 25, six lines after Section 10.3.2 heading: “is dominated the” should be “is dominated by the”

  (27/08/18. Thanks to Paul Dragulin).

- Page 25, line 6 from bottom, “whether free or bounds” should be “whether free or bound” .

  (24/12/18. Thanks to Harvey McArthur).

- Page 26, line 7 from bottom, “bounds” should be “bound” .

  (24/12/18. Thanks to Harvey McArthur).

- Page 27, line 14 from bottom, “rates” should be “rate” .

  (24/12/18. Thanks to Harvey McArthur).

- Page 42, three lines before Section 10.4.3 heading, “ a integrand” should be “an integrand”.

  (14/09/18. Thanks to Danny Laghi).

- Page 47, two lines before Section 10.5.1 heading, missing period at end of sentence ending in “proto-NS”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 49, line 7 from bottom, "bounces" should be "bounce".

  (24/12/18. Thanks to Harvey McArthur).

- Page 52, 6 lines up from Eq 10.103, "bursts" should be "burst".

  (27/08/18. Thanks to Paul Dragulin).

- Page 55, 6 lines up from bottom, "extents" should be "extent".

  (27/08/18. Thanks to Paul Dragulin).

- Page 58, second line, "$n^i = \mathbf{x}/|\mathbf{x}|$" should be "$\hat{\mathbf{n}} = \mathbf{x}/|\mathbf{x}|$".

  (29/07/18. Thanks to Simone Caletti)

- Page 58, 4 lines after Eq. 10.121 "retardation effect" should be "retardation effects"

  (27/08/18. Thanks to Paul Dragulin).

- Page 71, line 9 "ejects" should be "ejecta".

  (27/08/18. Thanks to Paul Dragulin).

- Page 66, line 5 from bottom, : "notion" should be "notions".

  (24/12/18. Thanks to Harvey McArthur).

- Page 73, left column, line 7, : "stars" should be "star".

  (24/12/18. Thanks to Harvey McArthur).

- Page 73, left column, line 16 from bottom, "simulation" should be "simulations".

  (24/12/18. Thanks to Harvey McArthur).

- Page 77, 2nd line from bottom, "longest know" should be "longest known".

  (27/08/18. Thanks to Paul Dragulin).

- Page 87, 9th line after Eq. 11.13, "consistent pictures" should be "consistent picture".

  (27/08/18. Thanks to Paul Dragulin).

- Page 107, Fig 11.8: the caption states that there are three EoS results shown. Actually there are two, and for one EoS is shown the result for two different values of the NS mass.

  (27/08/18. Thanks to Paul Dragulin).

- Page 108, line 7 "magnitudes" should be "magnitude".

  (27/08/18. Thanks to Paul Dragulin).

- Page 111, 3rd line up from start of Further Reading section: "only performed" should be "only be performed".

  (27/08/18. Thanks to Paul Dragulin).

- Page 138, line 3 on second paragraph after Summary section, "metric perturbation" should be "metric perturbations".

  (27/08/18. Thanks to Paul Dragulin).

- Page 139, line 22, "develped" should be "developed".

  (14/09/18. Thanks to Danny Laghi).

- Page 141, eq. (12.163):"$-\partial/\partial t^2$ " should be "$-\partial^2/\partial t^2$".

  (14/09/18. Thanks to Danny Laghi).

- Page 146, 2nd line after Eq 12.190, "Green's functions" should be "Green's function".

  (27/08/18. Thanks to Paul Dragulin).

- Page 152, line 9 "distinct contribution" should be "distinct contributions".

  (27/08/18. Thanks to Paul Dragulin).

- Page 157, line 19, "compex" should be "complex".

  (14/09/18. Thanks to Danny Laghi).

- Page 157, 1st line after Eq 12.240 "by an eigenfunction" should be "be an eigenfunction" and, on line 3 in Note 45 "imposes" should be "impose".

  (27/08/18. Thanks to Paul Dragulin).

- Page 160, line 19, “as a recursion relations” should be “as a recursion relation”.

  (14/09/18. Thanks to Danny Laghi).

- Page 164, two lines above the end, “and in particlar” should be “and in particular”.

  (14/09/18. Thanks to Danny Laghi).

- Page 168, 7th line after Section 12.5 “several time” should be “several times”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 169, 17 lines above the end, “and in this why one” should be “and in this way one”.

  (14/09/18. Thanks to Danny Laghi).

- Page 171, line 2, “”It is believe that” should be “It is believed that”.

  (14/09/18. Thanks to Danny Laghi).

- Page 171, Note 54, line 1, “are know” should be “are known”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 172, caption to Fig. 12.17 “dotter” should be “dotted” and, 2nd line after Eq 12.300, “coincide” should be “coincides”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 175, 1st line after Eq 12.323, “the Weyl tensor it is” should be “the Weyl tensor is”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 177, two lines above eq. (12.343), “one can chose” should be “one can choose”.

  (14/09/18. Thanks to Danny Laghi).

- Page 187, 4th line from bottom, first column, “emerged in this connections” should be “emerged in this connection”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 190, line 16 after Eq 13.3 “a pure gauge degrees” should be “a pure gauge degree”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 190, 17 lines above the end, “propagates” should be “propagate”.

  (14/09/18. Thanks to Danny Laghi).

- Page 193, note 4, “one of the coordinate” should be “one of the coordinates”.

  (14/09/18. Thanks to Danny Laghi).

- Page 201, note 12, “future directed” should be “future-directed”.

  (14/09/18. Thanks to Danny Laghi).

- Page 212, 8th line before Section 14.1, “250’000” should be “250,000” to keep with the convention used elsewhere in the book.

  (27/08/18. Thanks to Paul Dragulin).

- Page 215, 1st line after Eq 14.16 “of the particle 2” should be “of particle 2”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 218, note 9, 8 lines from bottom, “t_0” should be “ct_0”.

  (14/09/18. Thanks to Danny Laghi).

- Page 221, line 2, “t_0” should be “ct_0”.

  (14/09/18. Thanks to Danny Laghi).

- Page 228, 3 lines before Eq. 14.86, “values of R” should be “value of R”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 226, 10 lines from bottom, “One can try enforce” should be ”One can try to enforce”.

  (14/09/18. Thanks to Danny Laghi).

- Page 227, line 7, “i..e” should be “i.e.”.

  (14/09/18. Thanks to Danny Laghi).

- Page 228, line 11, "and it then called" should be "and is then called".

  (14/09/18. Thanks to Danny Laghi).

- Page 241, Note 37, 10th line from bottom, "a crucial features of" should be "a crucial feature of".

  (27/08/18. Thanks to Paul Dragulin).

- Page 242, 1st line after Eq 14.140, "generalized harmonic coordinate" should be "generalized harmonic coordinates".

  (27/08/18. Thanks to Paul Dragulin).

- Page 243. A clarification on the 1st line after eq. (14.146). I am not saying that the unit vector n^ν can be taken outside $\boldsymbol{\nabla}_\nu$; however, $n^\nu \boldsymbol{\nabla}_\nu C^\mu$ is one of the terms produced by $\boldsymbol{\nabla}_\nu (n^\nu C^\mu)$.

- Page 245, line 6, "of of" should be "of".

  (14/09/18. Thanks to Danny Laghi).

- Page 245, last paragraph. Here, following the convention in part of the literature, the fundamental mode is defined as that with $n = 0$. Note however that in Chapter 14 we used the convention that the fundamental mode is labeled as $n = 1$ (see e.g. Table 12.1 on page 161). For consistency, then, of page 245, 6 lines from bottom, "$n > 0$" should be "$n > 1$" and, 3 lines from bottom, "$n = 0$" should be "$n = 1$".

  (14/09/18. Thanks to Danny Laghi).

- Page 254, line 16, "the the aligned" should be "the aligned".

  (14/09/18. Thanks to Danny Laghi).

- Page 258, line 1, "or for $\alpha_1 = -\alpha_2 = 1$" should be "or for $\alpha_1 = -\alpha_2 = -1$".

  (14/09/18. Thanks to Danny Laghi).

- Page 260, line 4, "in a generic configurations" should be "in a generic configuration".

  (27/08/18. Thanks to Paul Dragulin).

- Page 263, 4th line after Eq 14.208, “a few hundreds” should be “a few hundred” and, 7th line before heading “Consequences for the formation...”: “can results” should be “can result”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 268, note 55, “that that” should be “that”.

  (14/09/18. Thanks to Danny Laghi).

- end of page 268-beginning of page 269, “restricted Newtonian approximation” should be “restricted post-Newtonian approximation”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 285, 17 lines from bottom, ”sweept up” should be ”swept up”.

  (14/09/18. Thanks to Danny Laghi).

- Page 288, 3rd line above Eq 15.17, “dimensionless combinations” should be “dimensionless combination”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 313, second paragraph, “it also produce” should be “it also produces”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 336, 8 lines from bottom, ”signal-to-noise ration” should be ”signal-to-noise ratio”.

  (14/09/18. Thanks to Danny Laghi).

- Page 339, 1st line after Section 16.3.1, “SBMH” should be “SMBH”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 346, 1st line after Eq 16.41, “the term in” should be “the terms in”.

  (27/08/18. Thanks to Paul Dragulin).

- Page 362, 6 lines from bottom, ”freqeuncy” should be ”frequency”.

  (14/09/18. Thanks to Danny Laghi).

- Page 370, 5th line after Sec. 17.1.1, "eq. (17.9)" should be "eq. (17.8)" and Note 6, 2nd line from bottom: "an invariant under" should be "an invariance under".

  (27/08/18. Thanks to Paul Dragulin).

- Page 387, 3rd line from bottom in Note 29: "increse" should be "increase".

  (27/08/18. Thanks to Paul Dragulin).

- Page 401, 9th line from bottom in Note 33: "must purposes" should be "most purposes".

  (27/08/18. Thanks to Paul Dragulin).

- Page 433, 1st line after 18.17, $\partial_i \partial_i \Sigma_{ij}$ should be $\partial_i \partial_j \Sigma_{ij}$.

  (27/08/18. Thanks to Paul Dragulin).

- Page 442, 1st line after Eq. 19.40: "Equations (19.36) and (19.40)" should be "Equations (19.36)–(19.40)".

  (27/08/18. Thanks to Paul Dragulin).

- Page 444, 6th line from bottom: "every modes is" should be "every mode is".

  (27/08/18. Thanks to Paul Dragulin).

- Page 451, 1st line after Eq 19.86: "second line" should be "third line".

  (27/08/18. Thanks to Paul Dragulin).

- Page 458, bottom line, "Fig. 19.9" should be "Fig. 19.3".

  (27/08/18. Thanks to Paul Dragulin).

- Page 459, 3rd line after Eq. 19.133: "right-hand side" should be "left-hand side"

  (27/08/18. Thanks to Paul Dragulin).

- Page 460, 5th line from bottom: "is know as" should be "is known as".

  (27/08/18. Thanks to Paul Dragulin).

- Page 467, 4th line up from Eq. 19.182: "on more parameter" should be "one more parameter".

  (27/08/18. Thanks to Paul Dragulin).

- Page 479, 3rd line after Eq 19.236: "could have be" should be "could have been".

  (27/08/18. Thanks to Paul Dragulin).

- Page 480, 2nd line after Eq. 19.247, as well as in the bottom line: "eq. (19.243)" should be "eq. (19.247)".

  (27/08/18. Thanks to Paul Dragulin).

- Page 488, 4th line above Section 19.5.4 heading, "the Section" should be "Section".

  (27/08/18. Thanks to Paul Dragulin).

- Page 490, 1 line above Eq. 19.289: "transfer function (19.253)" should be "transfer function (19.252)".

  (27/08/18. Thanks to Paul Dragulin).

- Page 491, Eq. (19.296), $h_{ij}^{\rm TT}(t)$ should be $h_{ij}^{\rm TT}$ and, as explained in the following line, $h_{ij}^{\rm TT}$ is a short-hand for $h_{ij}^{\rm TT}(\eta_0, \mathbf{x})$. More simply, one could write $h_{ij}^{\rm TT}(\eta_0, \mathbf{x})$ in eq. (19.296) and eliminate the sentence in the following line.

  (27/08/18. Thanks to Paul Dragulin).

- Page 497, 4th line from bottom: "standard candles" should be "standard sirens".

  (27/08/18. Thanks to Paul Dragulin).

- Page 503, 4th line from bottom: "non-trivial results" should be "non-trivial result" and, line 10 in note 53: "operator associated" should be "operators associated".

  (27/08/18. Thanks to Paul Dragulin).

- Page 531, line 16 in Note 11: the derivative w.r.t. τ should be w.r.t. η.

  (27/08/18. Thanks to Paul Dragulin).

- Page 532, 6th line after Eq. 20.126: "1 Mpc" should be "1 Gpc", as indeed correctly marked in the Figure.

  (27/08/18. Thanks to Paul Dragulin).

- Page 542, 2nd line before Eq. 20.174: "important informations" should be "important information"; 1st line before Eq. 20.174: "precedings equations" should be "preceding equations"; last line: "temperature perturbations" should be "temperature perturbation".

  (27/08/18. Thanks to Paul Dragulin).

- Page 544, 3rd line after Eq. 20.183: "The second hierarchy" is more clear if written as "The other hierarchy", or "The hierarchy (20.182)".

  (27/08/18. Thanks to Paul Dragulin).

- Page 550, 3rd line in Note 26: "both component" should be "both components".

  (27/08/18. Thanks to Paul Dragulin).

- Page 554, 5th line: "is spherical harmonics" should be "in spherical harmonics".

  (27/08/18. Thanks to Paul Dragulin).

- Page 556, 7th line in Note 29: "costumary" should be "customary".

  (27/08/18. Thanks to Paul Dragulin).

- Page 557, 4th line after Eq. 20.286: "harmonic" should be "harmonics"; 3rd line before Eq. 20.287: "$\alpha = \{r, \theta, \phi\}$" should be "$\alpha, \beta = \{r, \theta, \phi\}$".

  (27/08/18. Thanks to Paul Dragulin).

- Page 559, line 14: "effect become maximum" should be "effect becomes maximum".

  (27/08/18. Thanks to Paul Dragulin).

- Page 561, 3rd line in Note 35: "all arrival direction" should be "all arrival directions".

  (27/08/18. Thanks to Paul Dragulin).

- Page 567, line 3: "two distinct contribution" should be "two distinct contributions".

  (27/08/18. Thanks to Paul Dragulin).

- Page 627; 1 line before "Lyth bound" heading: "one more parameters" should be "one more parameter".

  (27/08/18. Thanks to Paul Dragulin).

- Page 629, line 2 in Note 35: "initial condition" should be "initial conditions".

  (27/08/18. Thanks to Paul Dragulin).

- Page 633, line 5: "and re-enter later" should be "and re-enters later".

  (27/08/18. Thanks to Paul Dragulin).

- Page 656, line 13: "should then starts performing" should be "should then start performing".

  (27/08/18. Thanks to Paul Dragulin).

- Page 660, 14th line from bottom: "to high" should be "too high".

  (27/08/18. Thanks to Paul Dragulin).

- Page 662, 6th line up from Eq. 22.63: "rolls down for $\phi = 0$" should be "rolls down from $\phi = 0$".

  (27/08/18. Thanks to Paul Dragulin).

- Page 666, 5th line after Eq. 22.85: "is a solutions" should be "is a solution".

  (27/08/18. Thanks to Paul Dragulin).

- Page 668, 1 line before Eq. 22.93 in Note 14: "we chose" should be "we choose" and, 2nd line from bottom in main text: "must simply interpreted" should be "must be simply interpreted".

  (27/08/18. Thanks to Paul Dragulin).

- Page 669, 5th line from bottom: "$-\beta/2 < \tau < \beta$" should be "$-\beta/2 < \tau < \beta/2$".

  (27/08/18. Thanks to Paul Dragulin).

- Page 678, 7th line up from Eq. 22.142: "over several realization" should be "over several realizations".

  (27/08/18. Thanks to Paul Dragulin).

- Page 699, 1 line before Eq. 22.244: "we get we have" should be "we get".

  (27/08/18. Thanks to Paul Dragulin).

- Page 704, 2 lines before Eq. 22.261: "on oscillation" should be "an oscillation".

  (27/08/18. Thanks to Paul Dragulin).

- Page 709, 11th line: "$f = f_s$" should be "$f = f_1$", and 23rd line, "pulsar timing" should be "pulsar timing arrays".

  (27/08/18. Thanks to Paul Dragulin).

- Page 711, 6th line:"it constraints" should be "it constrains".

  (27/08/18. Thanks to Paul Dragulin).

- Page 715, 4th line from bottom in Note 45: "a smooth decreases" should be "a smooth decrease".

- Page 725, Eq. 23.1, "$[\delta_{ij}+h^{\rm TT}_{ij}(t,\mathbf{x})dx^i dx^j]$" should be "$[\delta_{ij}+h^{\rm TT}_{ij}(t,\mathbf{x})]dx^i dx^j$".

  (27/08/18. Thanks to Paul Dragulin).

- Page 733, Eq. 23.52: "r_I" should be "r_{ab}".

  [27/08/18. Thanks (again!!) to Paul Dragulin].

I will be glad to receive further corrections from the readers.