```
Giacomo Petrillo, Florence, 2023-01-13

Typographical errors in "CAUSAL INFERENCE for Statistics, Social, and
Biomedical Sciences—An Introduction" by Imbens and Rubin, first edition (2015),
ISBN 978-0-521-88588-1

PART I
Introduction
############

Page 37, equation 3.7: Pr(W|X, Y(0), Y(1), X) = ...
                                          ~~~ remove this X

Next equation: p2(X, Y(0), Y(1)) = p2(X, Y(0), Y(1)) = 1/2,
               ~~~ replace 2 with 1

............

Page 39, equation 3.8:

    Pr(W|X, Y(0), Y(1)) = c · ∑ i=1^N q(Xi)^Wi · (1 - e(Xi))^1-Wi
                                     ~~~ replace q with e

............

Page 39, bottom:

    e(x) = E_SP[f(1|Yi(0),Yi(1),Xi,φ) f(Yi(0),Yi(1)|Xi,θ) | Xi = x]
                                     ~~~~~~~~~~~~~~~~~~~~~ delete

    e(x) is here a function of φ, a dependence that we usually suppress [...]
                               ~~ add: "and theta"

PART II
Classical Randomized Experiments
################################

CHAPTER 4
A Taxonomy of Classical Randomized Experiments
==============================================

Page 52, near end of section:

    If the covariates defining Bi corresponds to substantive information
                                           ~~~ delete

CHAPTER 5
Fisher’s Exact P-Values for Completely Randomized Experiments
=============================================================

Page 63:

    This corresponds to a p-value of 16/20 = 0. 80
                                              ~~~ delete
```

```
    [...] for this statistic for any values of the data is 2/20 = 0. 10
                                                                    ~~~ delete
```

In general in this book there are often stray spaces after the decimal point
or thousands comma.

....

Page 65, after equation 5.2:

```
    and the frequency distibutions of Yi(0) and Yi(1) have few outliers
                         ~~ r
```

....

Page 68:

```
    A rich class of possible test statistics with a form very different from a
    simple difference of averages outcomes
                               ~~~ delete
```

....

Page 73, both captions:

```
    Additive model with normal outcomes Tdif(-), Tmedian(-), Trank( . . . )
                                                            ~~~ use multiple dashes
```

....

Page 74, caption:

```
    Multiplicative model Tdif (-), Tmedian (-), Trank ( . . . )
                                                                  ~~ add "Tlog(-.)"
```

....

Page 75:

```
    for C ∈ {-3, -2.75, -2.50, . . . , 1. 00}
                                            ~~~
```

```
    where we get p-values larger than 0.05 is [-1. 44, 0. 06]
                                                     ~~~    ~~~
```

```
    we get p-values equal to or larger than 0.05 is [-2. 00, -0. 00]
                                                           ~~~     ~~~
```

CHAPTER 6
Neyman's Repeated Sampling Approach to Completely Randomized Experiments
==

Page 87, top equation:

```
    EW[τ̂dif|Y(0),Y(1)] = 1/N ∑ i=1^N (EW[Wi]·Yi(1) / (Nt/N) - EW[1-Wi)·Yi(0) / (Nc/N))
```

```
                                                                      ~~~ ]

............

Page 89, equation 6.4:

    (Yi(1) − Y̅(1)) · (Yi(0)) − Y̅(0))
                          ~~~

............

Page 95, end of each equation:

    0. 0311²
     ~~~

    0. 0305²
     ~~~

    0. 0312²
     ~~~

............

Page 97, equation:

    [...] = − 0.2154 / 0.0311 = 6.9.
           ~~~

............

Page 98, section 6.7:

    V̂neyman is unbiased for the sampling variance of the estimator τ̂dif for
    the  super-population, as opposed to the finite sample, average treatment
      ~~~~ excess space
    effect.

............

Page 99, equations:

    σc² = Vsp(Yi(0)) = Esp[(Yi(0) − Esp[Yi(0))²],
                                            ~~ ]

    σt² = Vsp(Yi(1)) = Esp[(Yi(1) − Esp[Yi(1))²].
                                            ~~ ]

............

Page 103, table 6.2: many stray spaces in the last column.

CHAPTER 7
Regression Methods for Completely Randomized Experiments
========================================================
```

```
Page 117, center:

    τ(x) = Esp(Yi(1)−Yi(0)|Xi=x],
             ~~~ [

............

Page 124:

    Esp[Yi | Xi=x,Wi=t] = αc + τsp · t + β'x,
                                         ~~~ delete prime

............

Page 126, equation 7.5:

    Esp[Yi | Xi =x,Wi =w] = α + τ·t + β'x + w·(x−μX)γ.
                                      ~~~ delete prime

............

Page 130, first equation:

    Esp[Yi | Xi =x,Wi =w] = α + τ·w + xβ + w·(x−μX)γ',
                                                   ~~~ delete prime

............

Page 137, first equation:

    −Wi · (Xi − μX)(βt − βc))²]
                           ~~~ enlarge this parenthesis

Second to last equation:

    × (Yiobs − α − τ·(Wi − p) − β'(Xi − μX) − γ'(Xi − μX)·Wi)².
                                ~~~           ~~~

............

Page 138, first equation:

    y − α − τ · (w − p) − (x − Esp[Xi]) β − γ'(x − Esp[Xi]) · t
                                            ~~~              ~~~ w

Equation A.1:

    N((0 0 0 0), Γ⁻¹Δ(Γ')⁻¹)
                      ~~~ Γ is symmetric, remove the transpose. It is not
                          technically wrong but it's confusing.

............

Page 139, first line:
```

```
    element of the matrix Γ⁻¹Δ(Γ')⁻¹
                               ~~~

............

Page 140:

    is given by Γ⁻¹Δ(Γ')⁻¹) as given in (A.1).
                     ~~~ ~~~

    partition Γ⁻¹Δ(Γ')⁻¹) as
                   ~~~ ~~~

    V = Γ⁻¹Δ(Γ')⁻¹) = ...
             ~~~ ~~~

CHAPTER 8
Model-Based Inference for Completely Randomized Experiments
===========================================================

Page 147, last paragraph: lots of stray spaces after decimal points.

............

Page 153:

    Step 1: Derivation of f(Ymis|Yobs, W, θ) First we combine the conditional
                                                             ~~~~~~~~~~~~~~~~~

    distribution, the conditional distribution
   ~~~~~~~~~~~~~~~

    as the product of these two vectors:
                               ~~~~~~~~~ distributions

............

Page 159, bottom line:

    has a Gaussian posterior distribution with meanequal
                                                  ~~

............

Page 161, last equation, in the covariance matrix: element 2,4 (33.2) is not
equal to element 4,2 (0). And there are stray spaces after decimal points.

............

Page 171:

    If the prior distribution for θ factors into a function of (αc, βc, σc2)
                                                               ~~~~

    and a function of (αt, βt, σt2), then we can factor the posterior
                      ~~~~
```

```
    distribution into a function of (αc, βc, σt2) and a function of (αt, βt,
                                     ~~~~                             ~~~~
    σt2),

Remove the αs.

............

Page 175, table 8.6:


    Mean Effect  0.25 quant   0.50 quant   0.75 quant
    -----------  -----------  -----------  -----------
    Mean (S.D.)  Mean (S.D.)  Mean (S.D.)  Mean (S.D.)
    -----------  -----------  -----------  -----------
    1.79 (0.63)  1.79 (0.63)  1.79 (0.63)  1.79 (0.63)
    ~~~~
    1.78 (0.49)  0.63 (0.35)  1.63 (0.55)  3.07 (0.64)
          ~~~~   ~~~~                      ~~~~
    1.57 (0.50)  0.42 (0.34)  1.40 (0.55)  2.89 (0.63)
    ~~~~  ~~~~   ~~~~                      ~~~~
    1.57 (0.74)  0.25 (0.30)  1.03 (0.53)  1.69 (0.72)
          ~~~~   ~~~~

To be compared to pages 175-176 in text:

    The posterior mean of τfs is equal to 1.80, with a posterior standard
                                          ~~~~

    The posterior mean for the average effect, τfs, is now 1.78, very similar
    to the 1.80 from before.
           ~~~~

    the posterior standard deviation for the average effect τfs is
    substantially lower, 0.44.
                         ~~~~

    The posterior means for the quantile effects are fairly different from
    those reported in the first row of the table, ranging from 1.38 for the
                                                               ~~~~
    0.25 quantile to 2.19 for the 0.75 quantile.
                     ~~~~

    The posterior mean for the average effect is now 1.60 with a posterior
                                                     ~~~~
    standard deviation equal to 0.47. The posterior means for the quantile
                                ~~~~
    effects range from 1.03 for the 0.25 quantile to 2.15 for the 0.75 quantile.
                       ~~~~                          ~~~~

    The posterior mean for the average effect is now 1.57, with a posterior
    standard deviation of 0.75. The posterior mean for the 0.25 quantile is
                          ~~~~
    much lower in this model, equal to 0.26.
                                       ~~~~
```

....

Page 179, section A.3:

```
    given Z is such that the distribution of σ−2 ·(S02 + ∑i (Zi − μ)2/(M+N)
                                                 ~~~ stray parenthesis
```

CHAPTER 9
Stratified Randomized Experiments
=================================

Page 188:

```
    9.2 THE TENNESEE PROJECT STAR DATA
                ~~~ SS
```

....

Page 192, section 9.3.2:

```
    of strata, and N(j), Ncj, and Nt(j) the total number of units,
                          ~~~ (j)
```

....

Page 197, bottom:

```
    The value of the statistic in the sample is 0. 224.
                                                 ~~~

    as large as 0.224, is p = 0. 034,
                               ~~~
```

....

Page 200, second equation: add parenthesis around the product, to keep out the term P(j)!. Same for third equation.

Third equation: the second product endpoint is P(j) − 1 instead of Sj − 1.

....

Page 203, last equation: stray space after decimal point.

....

Page 206, theorem 9.1:

```
    Then, for estimands τ∗ and τw defined in (9.3)
                               ~~~ ω
```

Equation 9.5:

```
    Yiobs = τ · Wi · Bi(j) / (N(j)/N) + ...
```

```
                       ~~~ J   ~~~ J
```

....

Page 207, section 9.6.2:

```
    τ̂ols = 0. 238 (s.e. 0. 103)
            ~~~          ~~~

    τ̂ols,inter = 0. 241 (s.e. 0. 095).
                  ~~~          ~~~
```

....

Page 208, equation 9.6:

```
    (Yi(0) Yi(1)) | Bi(j), θ ~ N(...
                   ~~~~~~~ Bi(j) = 1
```

Next paragraph:

```
    vector is θ = (μc(j), μt(j), σc2(j), σt2(j), w = 0, 1, j = 1, ..., J).
                                                ~~~~~~~~~~~ delete
```

Last equation:

```
    - replace σcσt with ηcηt
    - add t subscript to the last element of the mean vector
```

Bottom line: add ρ to the parameter vector.

....

Page 211-212:

```
    The proportion of women (Gi = f types) in the population is p. [...] Out of
    this sample of size N, we randomly draw Nt = q · N units to receive the
    active treatment and Nc = (1 − q) · N units to receive the control
    treatment.

    and the remaining Nc (f) = (1 − p) · q · N are assigned
                              ~~~~~~~~~~~~~ p (1 − q)

    In the second subsample Nt(m) = p · (1 − q) · N units
                                   ~~~~~~~~~~~~~ (1 − p) q

    and the remaining Nt(m) = (1 − p) · (1 − q) · N
                      ~~~ c

    τ̂strat = N(f)/N · τ̂dif(f) + N(m)/N · τ̂dif(m) = q · τ̂dif(f) + (1 − q) · τ̂dif(m).
                                                  ~~~ p              ~~~ p

    Vsp(τ̂strat) = q/N · (σt2(f)/p + σc2(f)/(1−p)) + (1 − q)/N · (σt2(m)/p + σc2(m)/(1−p)).
                 ~~~ p²        ~~~ q          ~~~ q  ~~~~~~~ (1−p)²     ~~~ q          ~~~ q
```

```
    N · (Vsp(τ̂dif)−Vsp(τ̂strat)) = q(1−q) · ((μc(f)−μc(m))²+(μt(f)−μt(m))²) ≥ 0.
                                 ~~~~~~~~ p (1 − p) (I guess)
```

....

Page 213, appendix A:

```
    The P(j) teachers can be assigned to the P(j) classes in P(j) different
                                                                ~~ !
```

....

Page 214, first and 4th equation: add parentheses to keep P(j)! out of the product.

....

Page 215, near the top:

```
    and τsp(j) = Esp[Yi(1) − Yi(0)|Bi(j) = 1], and where
        ~~~~ remove subscript
```

....

Page 216, first line:

```
    because E[Wi|Bi1, ..., Bi(j)] =
                  ~~~ (1)
```

Below first equation:

```
    Because pr(Wi = 1) = Jj=1 q(j) · e(j), and pr(Bi(j) = 1|Wi = 1) =
           ~~~~ Pr                            ~~~~ Pr
```

Second equation:

```
    ψ(Yobs,Wi,Bi1,...,Bi(j),τ̂ols,γ̂ols)
               ~~~ (1)
```

Third equation, second vector component:

```
    bj · (y − τ·(w − ∑ j=1^J e(j)·bj) − ∑ j=1^J γ(j)·bj)
    ~~~ this j refers, I guess, to the index of γ, but it's unclear
```

Fourth equation:

```
    √N · (τ̂ols − τ∗  γ̂ − γ∗) --d--> N((0 0 0), Γ⁻¹Δ(Γ')⁻¹)
         ~~~~~~ put ols in superscript instead of subscript
                    ~~~ add ols superscript
                                      ~~~~~~~~ add continuation dots between
                                               last two zeros
                                                    ~~~ delete transpose
```

Last equation:

```
    ψ(Yiobs,Wi,Bi1,...,Bi(j),τ,γ)
                ~~~ (1)

    pt
    ~~ e(1)

............

Page 217:

    the (1,1) element of Γ⁻¹Δ(Γ')⁻¹ is equal to
                              ~~~

CHAPTER 10
Pairwise Randomized Experiments
===============================

Page 222, first equation:

    Yj,B(1) if Wji,A = 0.
                ~~~ delete i

............

Page 226, below equation 10.1:

    By unbiasedness of the within-pair estimators, τ̂ is unbiased
                                                  ~~ "dif" superscript

    for the sample average treatment effect, τS.
                                             ~~~ fs

............

Page 227, theorem 10.1:

    (Yj,A(0) + Yj,A(1) - (Yj,B(0) + Yj,B(1)))²,
   ~~~                                     ~~~ enlarge outer parentheses

Last equation of theorem:

    (τpair(j) - τ)²
                ~~ "fs" subscript

Last equation:

    = 13. 4,
        ~~~

............

Page 228: stray space after the decimal point in all numbers.

Equations 10.2 and 10.3: add superscript "dif" to τ̂.
```

....

Page 236, first equation:

```
    VW(τ̂) =
       ~~ "dif" superscript
```

Second equation:

```
    (τ̂pair(j) − τ̂)²
                ~~ "dif" superscript
```

....

Page 237, first equation:

```
    (τpair(j) − τS)²
                ~~~ fs
```

....

Page 239: three occurences of $\Gamma^{-1}\Delta(\Gamma')^{-1}$ to be replaced with $\Gamma^{-1}\Delta\Gamma^{-1}$.

....

CHAPTER 11
Case Study: An Experimental Evaluation of a Labor Market Program
==

Page 241:

    The randomization did use demographics and labor market histories.

To be compared with page 247, bottom:

    This is not unexpected: the fact that the randomization was done without
    regard to the pre-treatment variables implies that,

Maybe there's a missing "not" in "did use demographics" above?

PART III
Regular Assignment Mechanisms: Design
#####################################

Page 261, last equation:

```
    (Yimis | Wi = w,Xi) ~ (Yimis | Wi = 1−w,Xi), for i=1,...,N.
                            ~~~~~ obs
```

....

Page 274, fourth equation:

```
    N · (1−ê(Xi))⁻¹ / ∑j:Wj=0 (1−ê(Xi)⁻¹    if Wi =0,
    ~~ "c" subscript                 ~~ missing parenthesis
```

```
    N · ê(Xi)⁻¹/ ∑j:Wj=1 ê(Xi)⁻¹            if Wi = 1.
    ~~ "t" subscript
```

....

Page 275, near the bottom:

```
    Who should we use as a match for the thirty-year-old woman with two
    children and four months of work experiments
                                    ~~~~~~~~~~~~~ experience
```

CHAPTER 13
Estimating the Propensity Score
===============================

Page 283, top paragraph:

```
    operationalize as some of the conventional goodness-of-fit measures,
                                                                  ~~~ .
```

Second paragraph:

```
    of the covariates to enter linearly into specification
                                           ~~ the
```

Third paragraph:

```
    score, and (ii) balance assesments of the estimated
                               ~~~ ss
```

....

Page 284, section 13.2:

```
    (Reinisch, Sanders, Mortenson, and Rubin, 1995).
                              ~~~ e
```

....

Page 285, section 13.3:

```
    As a result, it is is not always feasible
                      ~~~~
```

....

Page 288, end of section:

```
    ratio statistic of CL = 1 and CQ = 2. 71, corresponding
                                        ~~~
```

....

Page 294:

```
    2. Split Blocks That Are Both Inadequately Balanced and Amenable to
    Splitting [...] to propensity score values in ([bj−1, b'j) and in
                                                  ~~~ stray bracket

............

Page 295:

    For the second block with boundary values 0. 06 and 0. 9252,
                                               ~~~       ~~~

............

Page 296, section 13.7:

    One problem when conducting this assesment is the large amount
                                        ~~~ ss

............

Page 300, section 13.8:

    two columns for the two overall tests, and one for the
                                          ~~~~~ delete

............

Page 302:

    The Q–Q plot closely follows the 45⁰ line.
                                      ~~~ superscript zero, replace with °

............

Page 303:

    for the proposed specification, −1.627.7 for the linear specification,
                                     ~~~ ,

CHAPTER 14
Assessing Overlap in Covariate Distributions
============================================

Page 310, section 14.2:

    between the sample, rather than between the sample covariate distributions,
    rather than between the population covariate distributions,
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

............

Page 312, equation 14.4:

    = ln(σt) − ln(σt).
```

~~~ c

Second half:

    or for values of x greater than $F0^{-1}(1 − α/2)$
                                    ~~~ c

............

Page 313, equations 14.6 and 14.7: stray spaces after decimal points.

............

Page 317, section 14.5:

    we focused on differences between the covariate and estimated
                         ~~~~~~~~~ of

............

Page 318, near the top:

    we focus on a threshold of lu = 0. 1,
                                     ~~~

Section 14.6:

    in Chapter 13, at CL = 1 and CQ = 2. 71.
                                       ~~~

....

Page 319, second paragraph:

    and $\hat{\pi}$c0.05 πt0.05, and the proportions of control units and treated outside
    the 0.025 and ct 0.975 quantiles of the covariate distributions for both
    the control and treated units, respectively.

Fix this sentence.

....

Page 321, figures: replace X label "Linearized Propensity Score" with "lpbc420."

....

Page 334, figures: replace "the linearized propensity score" in the caption
with "earnings in 1975."

CHAPTER 15
Matching to Improve Balance in Covariate Distributions
==

Page 339:
                                       ~~~

```
    with analogous definitions for F̂t( · ) and f̂t⁻¹( · ).
                                              ~~~ F̂

............

Page 342, bottom line:

    in the propensity score itself because typically this
                                          ~~~~~~~~~~~ delete

............

Page 344:

    pre-specified dmax, say dmax = 0. 1. In practice, this
                                    ~~~

............

Page 345, section 15.5:

    deals with special cases where more-precise properties
                                      ~~~

............

Page 346, equation 15.1:

    pbr(γ) = 100 × (μt − μ0M)β / (μt − μc)β.
       ~~~ β             ~~~ c

............

Page 347, last equation:

    (μt − μcA)γ = cA ·(μt − μc)γ = ...
             ~~~ β            ~~~ β

............

Page 348:

    in the original sample, Zi|Wi=0 ~ N(0, c0 ·1K, IK),
                                          ~~~~~~~~~ delete

CHAPTER 16
Trimming to Improve Balance in Covariate Distributions
======================================================

Page 360, near the top:

    the true value of the propensity score equal to e(Xi) = 0. 999.
                                                             ~~~

    is in the treatment group is, by definition, e(Xi) = 0. 999.
```

```
                                                          ~~~

    Hence, among units with e(Xi) = 0. 999,
                                     ~~~

............

Page 363:

    and let e(x) = Nt(x)/N(x)
                  ~~~~~~~~~~~~ I think it's Esp[·] of this

............

Page 369, title of Table 16.3:

    Connors Right Heart Catherization Data
                            ~~ te

............

Page 370, title of Table 16.4:

    for Connors Right Heart Catherization Data
                                ~~ te

Table 16.4 heading:

    Controls (Nc = 2, 252)  Treated (Nt = 1, 867)
                    ~~~                    ~~~

............

Page 373, title of Table 16.5:

    Connors Right Heart Catherization Data
                            ~~ te

PART IV
Regular Assignment Mechanisms: Analysis
#######################################

CHAPTER 17
Subclassification on the Propensity Score
=========================================

Page 377:

    assumptions of individualistic assigment and
                                       ~~~ n

............

Page 385, section 17.4:
```

```
    We use the cutoff values tmax = 1. 96,
                                     ~~~
```

....

Page 386, end of section:

```
    and five subclasses reduces this to 0.04,
                             ~~~
```

....

Page 394, second equation:

```
    τ̂strat = 1/N ∑ i=1^N  Wi ·Yiobs ·λi − ...
                                      ~~ "strat" superscript
```

CHAPTER 18
Matching Estimators

Page 411:

```
    specific, assume that the correlation coefficient is equal to ρ = 0. 9,
                                                                       ~~~

    regressor X3 = (X1 − ρ · X2)/'1 − ρ2 ≈ (X1 − 0. 9 · X2)/√0.19.
                                                  ~~~
```

....

Page 414:

```
    average treatment effect for the treated of +0. 8 employees.
                                                  ~~~
```

....

Page 421–423: many stray spaces after decimal points (in text and tables).

....

Page 424, section 18.9:

```
    ither because we match and replacement control units
                          ~~~~~ with
```

....

Page 425, after equation 18.18:

```
    Now that we are matching with replacement, an important variable is the
    number of times each control unit is used as a match — let us call this
    L(i) = ∑ j=1^N 1_j∈Mic
                  ~~~~~~~~~ 1_i∈Mjc (swap i and j)
```

```
See section 18.10 below:

    To see this, consider the case where we match each treated unit to M
    controls. Let Mic represent the set of matches for unit i, with cardinality
    #Mic = M.

............

Page 426, first equation:

    j ∈ Mc(i)
         ~~~~~ move to subscript without parentheses

Equation 18.20: fix the subscript.

Next equation:

    Mc = {mic,1, mic,2, ..., miM}.
                              ~~~ c,M

............

Page 427, end of section:

    again letting Mc(i) denote the set
                   ~~~~~ move to subscript without parentheses

Equation after 18.22 and 18.23:

    mi = arg   min i':Wi'=0  |Xi'-Xi|,
        ~~~~~~~~~~~

Consider defining (in the preamble)

    \DeclareMathOperator*{\argmin}{arg\,min}

instead of using \arg\min_{...}, for a more conventional formatting.

............

Page 428, section 18.12:

    Because we are primarily interested in the effect of the minium wage
                                                                ~~ m

    with replacement, using the Mahalanobus metric
                                        ~~~ i

............

Page 430:

    effect for the New Jersey restaurants equal to +0. 51 employees.
                                                     ~~~
```

```
    estimated treatment effect equal to +0. 71 employees.
                                          ~~~

    using the pooled 2 · Nt observations, gives an estimate of +0. 79.
                                                                ~~~

CHAPTER 19
A General Method for Estimating Sampling Variances for Standard Estimators for
Average Causal Effects
===============================================================================

Page 438:

    This estimator, τ̂, is also a natural estimator
                    ~~ "strat" superscript

    the estimator for the overall average effect, τ̂. The sampling
                                                  ~~ "strat" superscript

    The denominators of the first two terms in the variance are
       ~~~~~~~~~~~~~~ numerators

............

Page 439, equation before 19.5:

    (Sc²(f)/Nc(f) + St²(f)/Nt(f) + Sct²(f)/Nf)
                                           ~~~ (f)

    (Sc²(m)/Nc(m) + St²(m)/Nt(m) + Sct²(m)/Nm)
                                           ~~~ (m)

............

Page 440, first equation, second line:

    = Esp[((τ̂ − (N(f) / (N(f) + N(m))·τsp(f) + N(m) / (N(f) + N(m))·τsp(m)))
            ~~ "strat" superscript

Below:

    A natural estimator for the sampling variance of τ̂
                                                      ~~ "strat" superscript

............

Page 449: a lot of stray spaces in numbers.

............

Page 451, bottom line:

    of the outcome in the trimmed sample is sY = 15. 5.
                                                    ~~~
```

```
............

Page 452: a lot of stray spaces in numbers.

............

Page 455, second to last equation:

    = 2. 9².
       ~~~

Last equation:

    =1. 41²,
      ~~~

Bottom line:

    (which we estimated to be 1. 40² in
                               ~~~

............

Page 456, second to last equation:

    σ̂j = 1/(N − K − 2)
            ~~ (j)

............

Page 457:

    The first and last two subclasses each have approximatley
                                                         ~~~~ el

............

Page 458, third equation:

    1   if li = j, li' = i,
               ~~~ I think it's i'

............

Page 459, fourth equation:

    σ̃ = 1/(N−1) (Ỹi(1)−Ỹi(0)−τ̂adj)².
              ~~~ ∑ i=1^N

Next line:

    The estimator for the sampling variance of τ̂bias−adj is then
                                               ~~~~~~~~~~ "adj" superscript
```

```
Next equation:

    V̂bias-adj = ...
    ~~~~~~~~~~ "adj" superscript

Next equation:

    V̂bias-adj = 1. 18².
                 ~~~
    ~~~~~~~~~~ "adj" superscript

Bottom line:

    to create a bootstrap sample of size N, with Ncunits
                                                  ~~ space

CHAPTER 20
Inference for General Causal Estimands
======================================

Page 466, section 20.3.2:

    The Lorenz curve LY(v) for, say, wealth, at a value y ∈ [0,1],
                       ---                             ~~~ v

............

Page 467, equation 20.2:

    GY = 1 - 2 ∫01 LY(y) dy.
                     ~~~ v
                         ~~~ v

............

Page 468, bottom line:

    Chi-squared distributions with parameters 1 and 0. 01 respectively.
                                                     ~~~

PART V
Regular Assignment Mechanisms: Supplementary Analyses
#####################################################

CHAPTER 21
Assessing Unconfoundedness
==========================

Page 480:

    known a priori not to be affected by versus treatment control.
                                        ~~~~~~~~~~~~~~~~~~~~~~~~~~ fix

Page 487, section 21.5.1:
```

```
    pre–treatment variables Xi to obtain apporoximately unbiased
                                                ~~~

............

Page 488, section 21.5.2:

    Let τSP = E[Yi(1) – Yi(0)] be the super–population average
        ~~~~ sp (lower case)

............

Page 489: In f_Yiobs|Wi=w,Xi=x(y|w,x), and similar, I'd remove the values in
the subscript: f_Yiobs|Wi,Xi(y|w,x).

............

Page 490, next equation after 21.18:

    = Xir βtr + E[Xip|Wi=0,Xir∈Xjr] βtp,
     ~~~~~ I think it's E[Xir|Xir∈Xjr]

End of section:

    selected covariates Xip with the outcome conditional
                                        ~~~~~~~~~ treatment

............

Page 491:

    for winners and losers is 14. 47 – 18. 00 = 3.53
                                 ~~~      ~~~

............

Page 494:

    τ̂spX = –6. 94 (s.e.=1.20),      τ̂spXr = –5. 92 (s.e.=1.16),
             ~~~                                 ~~~

    ... = –0. 13 s.e. = 0.12
            ~~~

    ... = –0. 19 s.e. = 0.11,
            ~~~

............

Page 498:

    τ̂dif = Ȳtobs – Ȳcobs = 0. 4106 – 0.5349 = –0.1243.
                            ~~~  ~        ~         ~ drop 1 digit

............
```

```
Page 500:

    the fraction treated is Nt/N = 0. 4675, and the survival
                                    ~~~

    groups are Y obs = 0.5349 and Y obs = 0. 4106, respectively.
                                           ~~~

    ... = [-0.56, 0. 44].
                   ~~~

............

Page 506, section 22.5:

    we can use Fischer's exact p-value approach to obtain
                 ~~~

PART VI
Regular Assignment Mechanisms with Noncompliance: Analysis
##########################################################

CHAPTER 23
Instrumental Variables Analysis of Randomized Experiments with One-Sided
Noncompliance
========================================================================

Page 513:

    by "secondary" we do not mean temporily but secondary
                                       ~~ ar

............

Page 515:

    under the exclusion restrction, the ITT effect
                            ~~ i

............

Page 516:

    With all three observed variables binary, there are, in principal,
                                                                  ~~~ le

............

Page 517:

    that (i) there are no versions of the treatments,
                         ~~ hidden?

............
```

```
Page 525:

    we can still distentangle the ITT effects by compliance type
                   ~~~

............

Page 527, top line:

    This assumption implies that the super-population distribution of Yi(0,1)
                                                                          ~~~ 0

    and so these restrictions have no empirical consquences,
                                                   ~~ e

    Moreoever, after the drug is approved, physicians
        ~~~

............

Page 529:

    the second exclusion restriction, the exlusion
                                           ~~ c

............

Page 532:

    in general it is not true that E[Yiobs|Wiobs = w] = α + τ · Wiobs.
                                                               ~~~~~~~ w

............

Page 533, first line:

    = Esp[Yi(0)|Gi = co] − (Esp[Yi(0)|Xi = co] · πco + Esp[Yi(0)|Gi = nc] · πnc)
                                     ~~~~ Gi

............

Page 535, first equation, second line:

    =Esp[νi|Zi =1,Gi =c]·πco =Esp[Yi(1)−Yi(0)−τ|Zi =1,Gi =c]
                                                            ~~ · πco

............

Page 537: stray spaces in numbers.

............

Page 538:
```

```
    even under the exclusion restriction for nomcompliers.
                                              ~~~ n

    these data, the first term of the estimand, Esp[Yi(1)|Gi = c]
                                                               ~~ o

    as 11, 514/(11, 514 + 74) = 0. 9936 (s.e. 0.0007).
         ~~~      ~~~            ~~~

    τ̂pp = 0. 9988 − 0. 9936 = 0. 0051 (s.e. 0. 0008),
           ~~~       ~~~       ~~~           ~~~

    of the local average treatment effect, τ̂late = 0. 0033.
                                                    ~~~

    Given the definition of the compliance types, τ̂CU estimates
                                                  ~~~~ cu

............

Page 539, end of section:

    τ̂cu = 0. 9988 − 0. 9859 = 0. 0128 (s.e. 0. 0024).
           ~~~       ~~~       ~~~           ~~~

............

Page 541:

    C(ITTY , ITTW) = −0. 00000017,
                       ~~~

CHAPTER 24
Instrumental Variables Analysis of Randomized Experiments with Two-Sided
Noncompliance
========================================================================

Page 542:

    In many applications this assumption is a pausible one,
                                              ~~ l

............

Page 547:

    ITTW = W̅1obs − W̅0obs = 0. 3387 − 0. 1928 = 0. 1460,
                            ~~~       ~~~       ~~~

    V(ITTW) = sW,0²/N0 + sW,1²/N1 = 0. 0108²,
                                     ~~~

    CI0.95(ITTW) = (0. 1247, 0. 1672).
                     ~~~ ~~~  ~~~ ~~~ drop 1 digit
```

```
............

Page 548:

    a drop in annual earnings of $212.90, and,
                                     ~~~~ drop 2 digits

    CI0.95(ITTearn) = (-0.6010, 0.1752).
                           ~~~~    ~~~~ drop 2 digits

............

Page 553, section 24.5.3:

    ITTY = Esp[Y(1, D(1)) - Y(0, D(0))]
                   ~~~ W        ~~~ W

    ITT effect for nevertakers and alwaystaker is zero,
                                             ~~ s

............

Page 555:

    f(Yi(1)|Gi =co)= (πa+πc)/πc ·f(Yobs|Wobs =1,Zi =1) - πa/πc
                      ~~~ at ~~~ co                      ~~~ at
                         ~~~ co                             ~~~ co

............

Page 556:

    Let τlate = ESP[Yi(1) - Yi(0)|Gi = co]
                ~~~~ sp

    α = πnt · Esp[Yi(0)|Gi = nt] + πco · Esp[Yi(0)|Gi = co]
        + πat ·Esp[Yi(1)|Gi =at] - πat · τ.
                                         ~~ late

............

Page 557, second equation:

    Esp[εi|Zi =0] = Esp[Yiobs -α-Wiobs ·τiv |Zi =z]
                                                ~~~ 0
                                        ~~~~ late

Replace τiv with τlate in the following lines too.

Third equation: replace τ with τlate.

Last equation:

    Esp[Yiobs|Zi] = α + τlate · ESP[Wiobs|Zi].
                                ~~~~ sp
```

```
............

Page 558, equations 1 to 3: replace τiv with τlate.

CHAPTER 25
Model-Based Analysis in Instrumental Variable Settings: Randomized Experiments
with Two-Sided Noncompliance
==============================================================================

Page 562, table 25.2, column "heart", first row:

    0.524
       ~~~ drop 1 digit

............

Page 564, table 25.3: stray spaces in numbers.

    Ê[Yi(1)|Gi = at] = Y̅0tobs = 0. 119 (s.e. 0.025).
                                 ~~~

............

Page 565, first equation:

    Ê[Yi(1)|Gi=co] = (Ê[Yiobs|Zi=1,Wiobs=1] − Ê[Yi(1)|Gi=at]·π̂a/(π̂co+π̂at)) /
(π̂co/(π̂co+π̂at))
                                                             ~~~ at

    ... = −0. 077(s.e. 0. 054).
            ~~~         ~~~

............

Page 566:

    ..., V(ITTW| Yobs, W) = 0.0191².
                                ~~~ drop 1 digit

............

Page 569:

    τlate = 1/Nc ∑i:Gi=co (Yi(1) − Yi(0)),
              ~~~ co

............

Page 570, bottom paragraph:

    As in the simpler situation of Chapter 8, such an i.i.d specification
                                                          ~~ .

............
```

```text
Page 572, section 25.4.3:

    f(Y(0), Y(1), W(0), W(1))|X, θ),
                           ~~~

    f (Y(0), Y(1), W(0), W(1))|X, Z, θ).
                            ~~~

............

Page 575, near the top:

    Moroever, as above, assume that f (Yi (w)|Gi = g, Xi , Zi , θ ),
      ~~~ e

PART VII
Conclusion
##########

CHAPTER 26
Conclusions and Extensions
==========================

Page 589:

    and rules out unrepresented levels of treatments
                                                   ~~ .

    in parciular, instrumental variables settings.
         ~~~~ tic

............

Page 590:

    which we intend to disucss from our perspective.
                         ~~~~ cu
```