

Erratum for “Optimization Models in Electricity Markets”

Anthony Papavasiliou, NTUA, Greece

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1. Greek textbook erratum

Add Cambridge original source

Page 15: change table 1 in second Greek edition

Page 14: change content in last paragraph “Κάποια βασική γνώση” in second Greek edition

Page 15: “Κεφάλαια 2 ... 11.1” -> change content in second Greek edition

Page 20: add paragraph for second Greek edition

Page 30: Σχήμα 4 -> κάτω γράφημα στο Σχήμα 2

Page 461: Γ -> 3 (second Greek edition)

Page 39: δραστηριότητες -> δραστηριότητες \$x_g\$

Page 52: add u

Page 53: add “τους περιορισμούς ισότητας”

Page 53: add “+Dy” and “-Dy” in exercise 2.2

Page 53: add “λ” in exercise 2.2

Page 53: add “+By” and “-By” in exercise 2.2

Page 54: “το υποδιαφορικό” -> «την υποπαράγωγο»

Page 55: remove “κατά”

Page 55: “το υποδιαφορικό” -> «την υποπαράγωγο»

Page 59: make “ισχύ” bold

Page 59: “σε επόμενο κεφάλαιο” -> «στην παρούσα ενότητα και στην Ενότητα 7.1»

Page 67: “Οι λύσεις ... τις” -> Στο κεφάλαιο 14 εξάγονται οι

Page 69: “kW” -> MW (twice)

Page 81: add €

Page 90: remove “Central West Europe”

Page 93: «και το πρόβλημα 3.3»

Page 102: introduce paragraph

Page 102: typo in definition 4.3

Page 102: remove “ G είναι το σύνολο των γεννητριών,”

Page 105: bold “τιμή εκκαθάρισης της αγοράς”

Page 105: change to “ισορροπία ανταγωνιστικής αγοράς”

Page 108: “ $j=1, \dots, m$ ” and change λ_i -> λ_j

Page 109: λ_i -> λ in Surplus-i problem definition

Page 107: add “ή κοινωνικό πλεόνασμα,”

Page 504: add “ πλεόνασμα!κοινωνικό 107”

Page 503: add “κοινωνικό πλεόνασμα 107”

Page 385: footnote 51, ϵ -> $-\epsilon$

Page 86: change ProofSecondPriceAuction2BWGR (top figure)

Page 108: \mathbb{R}^n -> \mathbb{R}^{n_i}

Page 403: “Ακραίο σημείο” -> «Σημείο»

Page 173: change D to d in first term of objective function in EDR

Page 171: drop “3” from figure 46 in $r^{\{3S\}}$ and double occurrence of $r^{\{3NS\}}$

Page 44: Add “Όπως αναφέρεται προηγουμένως ... και 80 MW αντίστοιχα”

Page 200: “Θετικό” -> «Αρνητικό»

Page 200: “αρνητικό” -> «θετικό»

Page 200: put minus in right hand side of power balance constraint

Page 202: “>” -> “<”

Page 202: “<” -> “>”

Page 202: add absolute value in right hand side of first constraint of first model

Page 202: drop absolute value from right hand side of first constraint of second model

Page 202: drop minus from left hand side of first constraint of second model

Page 186: change MC to OC twice

Page 187: change MC to OC twice

Page 420: “πιο ακριβές” -> «λιγότερο ακριβές»

Page 93: “ώρες” -> περιόδους

Page 93: “ώρες” -> «περίοδοι»

Table 9: “Ωρα” -> «Περίοδος» (4 times)

Page 244: add “ $d_A \geq 0$ ” in top math program

Page 125: space and non-italic

Page 132: δεδομένης in italic

Page 133: add “locational marginal prices”

Page 332: remove “αν το σύστημα ... εξυπηρετείται”

Page 339: “μπορεί κανείς να δείξει” -> «προκύπτει»

Page 273: drop $\sum_{g \in G} P_g$

Page 272: change “<” to “<=”

Page 211: swap TA with TB in summation in bottom of page and TB in right part of sum

Exercise 11.5: change “συμπεριλαμβάνει” to «περιλαμβάνει»

Page 32: exercise 1.2: “χρησιμοποιώντας” -> «χρησιμοποιώντας»

Page 139: change “βάσης” -> «αναφοράς»

Page 145: in (ZPT) model, constraint with dual ρ_z , change “=” to “-“ and “-“ to “+”

Page 149: in (ZPT) model, constraint with dual ρ_z , change “=” to “-“ and “-“ to “+”

Page 330: “πιθανότητας” -> «πιθανότητες»

Page 149: model (ZPFB), change index on second constraint, $PTDF_{\{l\}}$ -> $PTDF_{\{k\}}$

Page 409: change B' , D' and F' to math font in the paragraph before figure 104

Page 236: add minus in last equation of page

Page 237: add minus in first term of third equation

Page 237: add minus before g and replace minus with plus before p^* in definition of LOC

Page 385: move μ out of parenthesis in first and second KKT condition of proof

Page 123, figure 34: change ρ_n to r_n in energy balance constraint of transmission system optimization problem formulation

Page 21: add “where f_0 is convex, f_i are convex and h_i are affine”

Page 45: Replace “Για κυρτά προβλήματα βελτιστοποίησης με παραγωγίσιμες αντικειμενικές συναρτήσεις και περιορισμούς και μηδενικό κενό δυϊκότητας, οι συνθήκες KKT είναι επίσης ικανές για μια βέλτιστη λύση (βλέπε Πρόβλημα \ref{exrc:KKTsufficient}).”

With

“Για κυρτά προβλήματα βελτιστοποίησης με παραγωγίσιμες αντικειμενικές συναρτήσεις και περιορισμούς όπου οι συναρτήσεις f_i είναι κυρτές και οι συναρτήσεις h_i είναι οίονει γραμμικές, οι συνθήκες KKT είναι επίσης ικανές για μια βέλτιστη λύση και εγγυώνται μηδενικό κενό δυϊκότητας (βλέπε Πρόβλημα \ref{exrc:KKTsufficient}).”

Σελίδα 53: Αναδιατύπωση προβλήματος 2.1

- Προσθέτουμε “όπου οι συναρτήσεις f_i είναι κυρτές και οι συναρτήσεις h_i είναι οίονει γραμμικές”

Σελίδα 228: παρόν -> παρών

Σελ 360: make D_1 , D_2 , D_3 italic in statement of problem 11.5

Σελ 360: make λ_2 and λ_3 italic

Page 360: change 9008 to 9004 MW in D_2 in exercise 11.5

Page 182: max not italic in caption of figure 49

Page 463: replace 500 with 1000 in solution of problem 3.7, computation of $TC^{(2)}$

Page 464: replace $\frac{1000}{3}$ 1000/3 with 1000 in solution of problem 3.7, computation of $TC^{(3)}$

Page 47: replace “ελαχιστοποίησης” with “μεγιστοποίησης”

Page 130: figure 37, change font of power consumption (“100 MW” and “200 MW”) to make the font consistent with that of prices (i.e. make font smaller)

Page 464: replace $\sum_{t=0}$ with $\sum_{t=1}$ (twice)

Page 108: the minus in front of the third term of the left hand side of 4.18 should be a plus

Page 110: the minus in front of the first term of the left hand side of the first equation of the proof should be a plus

Pages 24, 26: replace “ το συνολικό φορτίο από τη συνολική αιολική παραγωγή” with “τη συνολική αιολική παραγωγή από το συνολικό φορτίο”

Page 112: Move “Εδώ ... πράκτορα” before phrase “Η συνεπαγωγή ... λόγω συμμετρίας” of page 111.

Page 458: Add “Inframarginal rent <-> Υπο-οριακό ενοίκιο”

Page 362: Add “Παραπέμπουμε τον αναγνώστη στην Παράγραφο 1-6.6 του (Stoft, 2002) για μια εις βάθος συζήτηση περί ενοικίων σπανιότητας και υπο-οριακών ενοικίων.”

Page 139: Insert “Ας υποθέσουμε πως ο κόμβος 2 είναι κόμβος αναφοράς.”

Page 139, τέλος παραδείγματος 5.10: Insert “Αξίζει να σημειωθεί πως το μοντέλο (*DCOPF – L*) δεν είναι αμετάβλητο ως προς τον κόμβο αναφοράς. Συγκεκριμένα, αν επιλεγεί ο κόμβος 1

ως κόμβος αναφοράς, προκύπτει μια ελαφρώς διαφορετική προσέγγιση των απωλειών και η τοπική οριακή του κόμβου 2 γίνεται ίση με 20.40 €/MWh (αντί 20.41 €/MWh).”

Page 140: change “ $-\infty$ ” to “ $+\infty$ ” in table 6.4

Page 203: remove “είτε $\mu^*=0$ είτε” and add “Πότε είναι μη μηδενική αυτή η ποσότητα;”

Page 235: replace λ with λ_t

Page 235: replace λR with λR_t

Page 239: replace λ with λ_t

Page 239: replace λR with λR_t

Page 239: replace D_t with t as subscript

Page 239: replace D_t with t as subscript

Page 240: replace λ with λ_t

Page 240: replace λR with λR_t

Page 272: replace “ $<$ ” with “ \leq ” twice

Page 326: replace “αύξουσας” with «φθίνουσας»

Page 325: Add “Αξιοπιστία, για το υπόλοιπο της Υποενότητας 10.2, νοείται ως η πιθανότητα να εξυπηρετηθεί ένας καταναλωτής ηλεκτρισμού που ζητά να καταναλώσει.” after first sentence of second paragraph of section 10.2

Page 328: add two parentheses and “:” in first equation of page

Page 431: replace “incidence” with “adjacency”

Page 237: add “(σελίδα 327)”

Page 170: figure 45 has been corrected

Page 175: last constraint in first block of conditions needs to be replaced by the following:

$$\begin{aligned}r1_{g,i}^+ &\leq R1_g, r1_{g,i}^- \leq R1_g, g \in G, i \in \{1,2,3\} \\ r2_{g,i} &\leq R2_g, g \in G, i \in \{2,3\} \\ r3_g &\leq R3_g, g \in G\end{aligned}$$

Page 211: add “ $g \in G,$ ” in last constraint

Page 212 : last gray dot in figure 7.2 should be a white point with a black circle

Page 212 : Add «και οι κουκκίδες με λευκό χρώμα σε μαύρο κύκλο αντιστοιχούν σε $u_{gt}=0$ »

Page 213: add «+1» to lower bound of summation of last equation before section «Παραγωγή εκκίνησης/τερματισμού»

Page 213: remove “-1” from upper limit of summation of last equation before section “Παραγωγή εκκίνησης/τερματισμού”

Page 213: remove “+1” from upper limit of set that defines the last constraint before section “Παραγωγή εκκίνησης/τερματισμού”

Page 213: correct index of $P^{\{SD\}}_{\{g \ \tau\}}$ to $P^{\{SD\}}_{\{g, T_g^{SD} - \tau + t + 1\}}$ in last equation before «Παραγωγή όταν η γεννήτρια είναι διαθέσιμη προς κατανομή»

Page 47 : add «>=0» in subscript of \min_p in first equation of example 2.4

Page 243: «υποκείμενο στους» -> «με τους»

Page 148: bold to “συντελεστές διανομής γεννητριών”

Page 148: μεταοράς -> μεταφοράς

Page 213: change $u_{\{gt\}}^{\{SU\}}$ to $u_{\{gt\}}^{\{SD\}}$ in last equation before “Παραγωγή εκκίνησης/τερματισμού”

Page 213: drop l in $T_{\{gl\}}^{\{SD\}}$ in last equation before “Παραγωγή εκκίνησης/τερματισμού”s

Page 213: «αν το $u_{\{gt\}}^{\{SU\}}$ είναι ενεργό» -> $u_{\{gt\}}^{\{SD\}}$

2. English textbook erratum

Page 15: of remaining -> of the remaining

page 260: add minus sign in front of VOLL*ls in ORDC model objective function

page 280: energy -> corn

page 281: energy -> food

page 281: "price of corn" -> "marginal cost of corn"

page 292: A_{ij} -> A_{ji} (or swap role of i and j indices)

page vii: forwards -> forward contracts

page 217: forwards -> forward contracts

page 217: correct $\xi_{[t]}$ in first equation of section 9.3.1

page 218, equation 9.2: change θ_t to $\xi_{[t]}$

page 218, equation 9.3: change θ_t to $\xi_{[t]}$

page 220: replace θ_t with $\xi_{[t]}$ (four times)

remove section 5.2.1: «το σύστημα δύο διακανονισμών»

page 277: AEF -> AEFB

page 356: Add the following at the end of problem 12.6, question 1:

“The global demand at market equilibrium is 38 billion barrels and the price is 60 \$/barrel.”

Page 20: “keeps the first unit off” -> “has”

Page 20: remove “produces from units 2 and 3”

Page 71: “one-shot” -> “monolithic”

Page 108: “(OPF)” -> “(DCOPF)” in exercise 5.9

Page 244: “ C_i ” -> “ MC_i ”

Page 255: Add “\textit{Confirming that $I_n \simeq VOLL \cdot LOLP$.” after introduction of example 11.5

Page 213: “is is demonstrated” -> “is demonstrated”

Page 49: change $(20 - \lambda)$ to $(\lambda - 20)$

Page 344: OPF -> DCOPF

Page 346: remove $dr \geq 0$ from last line of model description in problem 6.6

Page 228: var -> Var

Page 70: “ $j=1, \dots, m$ ” and change λ_i -> λ_j

Page 373: change “67” to “69” in “total surplus”

Page 373: change “67” to “69” in “surplus, total”

Add “social surplus” and “surplus!social” in index section

Page 282: footnote 3, change epsilon to -epsilon

Page 52: change ProofSecondPriceAuction2BW (top figure)

Page 86: move text “The uniform prices ... (LMPs).” after proof of proposition 5.5 (before “It is worth emphasizing ...”)

Page 86: Make “locational marginal prices” bold

Page 134: change italic to bold in “scarcity pricing”

Page 71: replace λ with λ_i twice

Page 116: replace “hour 3” with “hours 3 and 4”

Page 296: “Extreme point” -> “Point”

Page 117: drop “3” from figure 6.3 in $r^{\{3S\}}$ and double occurrence of $r^{\{3NS\}}$

Page 20: Add “As mentioned previously ... and 80 MW respectively”

Page 139: “positive” -> “negative”

Page 139: “negative” -> “positive”

Page 139: put minus in right hand side of power balance constraint

Page 141: “>” -> “<”

Page 141: “<” -> “>”

Page 141: add absolute value in right hand side of first constraint of first model

Page 141: drop absolute value from right hand side of first constraint of second model

Page 129: change “MC” to “OC” four times

Page 309: “most expensive” -> “least expensive”

Page 58, table 3.5: “Hour” -> “Interval” (4 times)

Page 58: “hours” -> “intervals”

Page 85: M -> M

Page 86: Add “\$” (twice)

Page 88: “the above proposition” -> “proposition 5.5”

Page 234: remove “if the system ... can be left unserved”

Page 196: change “<” to “<=”

Page 148: correct three bars/underbars in inequality of “temperature-dependent startup” paragraph

Page 301: change B' , D' and F' to math font in paragraph before section A.8

Page 168: add minus in first equation of page

Page 168: add minus in first term of third equation

Page 237: add minus before g and replace minus with plus before p^* in definition of LOC

Page 97: replace “ $-ATC^+_a$ ” with “ $ATC_a^- \leq$ ” in definition of \mathcal{R}

Page 283: move μ out of parenthesis in first KKT condition of proof

Page 373: add reference to page 96 (definition 5.11) in zonal pricing index term

Page 21: Replace “For convex optimization problems with differentiable objective functions and constraints and a zero duality gap, the KKT conditions are also sufficient for optimality (see exercise \ref{exc:KKTsufficient}).”

with

“For convex optimization problems with differentiable objective functions and constraints where f_i are convex and h_i are affine, the KKT conditions are also sufficient for optimality and guarantee a zero duality gap (see exercise \ref{exc:KKTsufficient}).”

Page 27: Rephrase statement of problem 2.1

- Remove “for which there is a zero duality gap,”
- Add “where f_i are convex and h_i are affine”
- Add “and the optimality gap is zero” in the end

Page 263: change 9008 to 9004 MW in D_2 in exercise 11.5

Page 263: change ΔT_2 to D_2 in statement of problem 11.5

Page 52, figure 3.16: remove arrow in case 1.1 and case 2.1

Page 52, figure 3.16: add “900” on top of “our bidder/winning bidder” in right part of case 1.1

Page 340: change 500 to 1000 in solution of problem 3.7, computation of $TC^{(2)}$

Page 340: change $\frac{1000}{3}$ to 1000 in solution of problem 3.7, computation of $TC^{\{3\}}$

Page 23: replace “minimization” with “maximization”

Page 340: replace $\sum_{t=0}$ with $\sum_{t=1}$ (twice)

Page 70: the minus in front of the third term of the left hand side of 4.18 should be a plus

Page 71: the minus in front of the first term of the left hand side of the first equation of the proof should be a plus

Page 5: replace “total load from wind power production” with “wind power production from total load”

Page 72: move the phrase “Here ... agent” before the phrase “The implication ... due to symmetry”.

Page 265: Insert the following after “Stoft (2002, §2-2).”:

The reader is referred to Stoft (2002, § 1-6.6) for an insightful discussion on scarcity rents and inframarginal rents.

Page 93: Insert “Suppose that node 2 is the hub node.” before “The (DCOPF) model ...”

Page 93, end of example 5.10: Insert “It is worth noting that the \$(DCOPF-L)\$ model is not invariant to the choice of hub node. Choosing node 1 as the hub node leads to a slightly different approximation of losses and an LMP of 20.40 \$/MWh in node 2.”

Page 140: change “ $-\infty$ ” to “ $+\infty$ ” in table 6.4

Page 141: remove “either $\mu^{\star}=0$ or” and add “When is this quantity non-zero?”

Page 166: replace (twice) λ^R with λR

Page 167: replace (three times) λ^R with λR

Page 168: replace (twice) λ^R with λR

Page 169: replace λ^R with λR

Page 170: replace λ^R with λR

Page 166: replace λ with λ_t

Page 166: replace λR with λR_t

Page 170: replace λ with λ_t

Page 170: replace λR with λR_t

Page 171: replace λ with λ_t

Page 171: replace λR with λR_t

Page 196: replace “<” with “<=” twice

Page 237: replace “increasing” with “decreasing”

Page 236: Add “Reliability in the remainder of section 10.2 is to be understood as the probability that a consumer who asks to be served is actually served.” after first sentence of second paragraph of section 10.2

Page 238: add two parentheses and “:” in last equation of page

Page 318: replace “incidence” with “adjacency” (twice)

Page 371: replace “incidence” with “adjacency”

Page 371: replace “incidence” with “adjacency”

Page 246: change Δ_j to ΔT_j three times

Page 247: change T_j to ΔT_j

Page 168: add “(page 327)”

Page 116: figure 6.2 has been corrected

Page 120: last constraint in first block of conditions needs to be replaced by the following:

$$r_{g,i}^+ \leq R_{1g}, r_{g,i}^- \leq R_{1g}, g \in G, i \in \{1,2,3\}$$

$$r_{g,i} \leq R_{2g}, g \in G, i \in \{2,3\}$$

$$r3_g \leq R3_g, g \in G$$

Page 148 : add “ $g \in G$,” in last constraint

Page 149 : last gray dot in figure 7.2 should be black

Page 150 : drop l in $T_{\{g\}}^{\{SD\}}$ in upper limit of summation in last equation before «Dispatchable production»

Page 150 : Add « T » in upper limit of last constraint before “Dispatchable production”

Page 149 : Add «The white point with the black circle indicates $u_{\{g\}}=0$ »

Page 150 : add « $+1$ » to lower bound of summation of last equation before section «Startup/shutdown production»

Page 150: remove “ -1 ” from upper limit of summation of last equation before section “Startup/shutdown production”

Page 150: remove “ $+1$ ” from upper limit of set that defines the last constraint before section “Startup/shutdown production”

Page 150: correct index of $P^{\{SD\}}_{\{g \ \tau\}}$ to $P^{\{SD\}}_{\{g, T_g^{SD} - \tau + t + 1\}}$ in last equation before «Dispatchable production»