

# The Acid Rain Game: a Formal and Mathematically Rigorous Analysis

## CORRECTIONS AND SUPPLEMENTS

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### Corrections:

1. The word ‘Pareto-efficient’ should be everywhere replaced by ‘Pareto efficient’ and the word ‘Pareto-inefficient’ by ‘Pareto inefficient’.
2. At some places brackets ‘[ ]’ are used (due to the publisher) after a function symbol; this is not nice, they should be replaced by ‘( )’. For instance this is two times the case in the first line of page 154.
3. *Page 140, Definition 1, property 7:*  $\dots$  and  $\theta^j : (0, M^j] \rightarrow \mathbb{R}$  is twice
4. *Page 142, line 5*  $\downarrow$ :  $\dots (Q^j \in (0, r^j])$ ,
5. *Page 142, line 5*  $\downarrow$ :  $\dots (x^j \in (0, M^j])$  and  $\dots$
6. *Page 143, line 12*  $\uparrow$ :  $\dots$  and  $B^j(\mathbf{z}) = \mathcal{B}^j(Q_\star^j(\mathbf{z}))$ ,
7. *Page 143, line 2*  $\uparrow$ :

$$\mathcal{B}^{j'}(c) = -\frac{T_{jj}^2 \mathcal{D}^{j''}(T_{jj}(\mathcal{B}^j(c) + c))}{T_{jj}^2 \mathcal{D}^{j''}(T_{jj}(\mathcal{B}^j(c) + c)) - \theta^{j''}(\mathcal{B}^j(c))}. \quad (9.1)$$

8. *Page 143, line 1*  $\uparrow$ :  $\dots$  that  $\mathcal{B}^{j'} \leq 0$  and  $\dots$
9. *page 144, line 9*  $\uparrow$ :  $\dots$  dominant emission level. See von Mouche (2004) for an example. [[See [1] below for this reference.]]
10. *Page 147, line 6*  $\uparrow$ :  $\theta^{1'}(y^j) = \frac{T_{jj}}{\beta_{j1} T_{11}} \sum_{r=1}^N \dots$
11. *Page 151, line 9*  $\downarrow$ :  $\dots$  each emission vector in  $(\mathbf{a}, \mathbf{b}]$ .
12. *Page 152, Research problem 2:*  $\dots$  than or equal to that in  $\mathbf{n}$ . (Compare Theorem 19.)
13. *Page 153:*  $\dots$  of the function  $(h_c^j)' : (0, M^j)$
14. *Page 154, line 6*  $\downarrow$ : we have  $\theta^{j'}(n^j) = T_{jj} \mathcal{D}^{j'}(Q^j(\mathbf{n})) \geq T_{jj} \mathcal{D}^{j'}(Q^j(\mathbf{z}))$
15. *Page 154, line 7*  $\downarrow$ :  $\dots$  thus  $\theta_{-}^{j'}(n^j) \geq \theta_{+}^{j'}(z^j)$ ; because
16. *Page 154, line 11*  $\downarrow$ :  $\dots$  and thus that  $(a, \dots, a)$  is
17. *Page 155, in Proof of Theorem 11, line 6*  $\downarrow$ : that  $(g_{z^j}^j)'(z^j) \geq 0$ . From  $\dots$
18. *Page 155, in Proof of Theorem 11:* Replace everywhere ‘ $\mathbf{z}^j$ ’ by ‘ $\mathbf{z}^{\hat{j}}$ ’.

19. Page 155, line 6  $\uparrow$ : Take  $k \in \text{supp}(\boldsymbol{\lambda})$  with  $\dots$
20. Page 156, line 5  $\downarrow$ :  $\dots$  defined by  $c^k := b^k$  ( $k \neq \pi(N)$ )  $\dots$
21. Page 155, formula (9.5):  $\dots \leq \frac{T_{ii}}{T_{jj}} \frac{1}{1-\theta^{j''}/(T_{jj}^2 D^{j''})} \leq |D_i B^j|$ . (9.5)
22. Page 158, line 14  $\downarrow$ :  $\dots$  Because  $S^{j'}$  : [0,
23. Page 159, Note 3, line 3  $\downarrow$ :  $\dots$  in Welsch is almost the same as ours
24. Page 160, note 15:  $\dots$  for all permutations  $\pi$  of  $\mathcal{N}$ ,  $\mathbf{x} \in \mathbf{X}$   $\dots$

Comments: Concerning the 8 research problems on page 152. Problems 3 and 8 have been done in [1]. And in [1] it has been proved that the answer to Problem 4 is ‘yes’.

Further reading:

[1] P. v. Mouche, Formal transboundary pollution games. In preparation.

If you discover more (mistakes), please let me know. I will be happy to know them.