Monadic Quantifiers Recognized by Deterministic Pushdown Automata: Corrigendum (January 1, 2014)

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Lemma 3 on page 142 of my paper for the 19th Amsterdam Colloquium (Kanazawa 2013), attributed to Harrison 1978, was stated incorrectly. It should be corrected as follows:

**Lemma 3.** Let \( L \subseteq \Sigma^* \) be a DCFL. There exists a regular set \( R \subseteq L \) satisfying the following property: for every \( w \in L - R \), there exist \( x_1, x_2, x_3, x_4, x_5 \) such that

(i) \( w = x_1x_2x_3x_4x_5 \);
(ii) \( x_2x_4 \neq \varepsilon \);
(iii) for every \( z \in \Sigma^* \) and \( n \in \mathbb{N} \), \( x_1x_2x_3x_4z \in L \) if and only if \( x_1x_2^n x_3x_4^n z \in L \).

We also need to refer to Proposition 8 on page 146, which can be proved with the help of the following lemma:

**Lemma A.** Let \( L \subseteq \Sigma^* \) be a regular language. There exists a positive integer \( p \) satisfying the following property: for every \( w \in L \) with \( |w| \geq p \), there exist \( x_1, x_2, x_3 \) such that

(i) \( w = x_1x_2x_3 \);
(ii) \( x_2 \neq \varepsilon \);
(iii) \( |x_1x_2| \leq p \);
(iv) for every \( z \in \Sigma^* \) and \( n \in \mathbb{N} \), \( x_1x_2z \in L \) if and only if \( x_1x_2^n z \in L \).

The paragraph after Lemma 4 should be corrected as follows:

To prove the “only if” direction of Theorem 1, suppose that \( W_Q \) is recognized by a deterministic PDA. By Parikh’s theorem, \( V_Q \) is semilinear. If \( W_Q \) is regular, then by Proposition 8, \( V_Q \) satisfies the conditions of the theorem. If \( W_Q \) is not regular, then, by Lemma 3, there must be \( w = x_1x_2x_3x_4x_5 \in W_Q \) that satisfies the conditions (i)–(iii) of Lemma 3. . . .

It’s not immediately obvious how Lemma 3 follows from Harrison’s (1978) iteration theorem for DCFL. See my blog post at [http://makotokanazawa.blogspot.jp/2013/12/machine-based-approach-to-pumping.html](http://makotokanazawa.blogspot.jp/2013/12/machine-based-approach-to-pumping.html) for a direct proof of Lemma 3.

References