ADDENDUM

to the paper

INEQUALITIES FOR THE MAXIMAL EIGENVALUE OF A NONNEGATIVE MATRIX

by LINA YEH

We gave an elementary proof of Theorem 4 in the paper, published in the *Glasgow Mathematical Journal* **39**(1997), 275–284. The result provides an algorithm for approximating the maximal eigenvalue of a nonnegative matrix. Recently the author has learnt that the result can be proved immediately from Theorem 6.8 in [**1**]. Indeed, the paper [**1**] determines necessary and sufficient conditions for the convergence of an iterative sequence to the maximal eigenvalue. Their proof needs knowledge of graph theoretical concepts.

By setting $x = [1\ 1 \ldots 1]^T$, we have

$$\begin{aligned} r(A^k x) &\equiv \sup\{\mu : \mu A^k x \leq A^{k+1} x\} \\ &= \min_{i=1}^{n} \frac{(A^{k+1}x)_i}{(A^k x)_i} \\ &= \min_{i=1}^{n} \frac{r_i(A^{k+1})}{r_i(A^k)} \\ &= \min_{i=1}^{n} r_i^{(k)}. \end{aligned}$$

Similarly, we have $R(A^k x) \equiv \inf\{\mu : \mu A^k x \geq A^{k+1} x\} = \max_{i=1}^{n} r_i^{(k)}$. Now by Theorem 6.8 in [**1**], $\lim_{k\to\infty} r(A^k x) = r = \lim_{k\to\infty} R(A^k x)$. It follows that $r = \lim_{k\to\infty} \max_{i=1}^{n} r_i^{(k)} = \lim_{k\to\infty} \min_{i=1}^{n} r_i^{(k)}$, and this proves the second part of Theorem 4.

REFERENCE

1. S. Friedland and H. Schneider, The growth of powers of a nonnegative matrix, *SIAM J. Alg. Disc. Meth.* **1** (1980), 185–200.

Department of Mathematics
Soochow University
Taipei
Taiwan