Mathematical Programming 41 (1988) 393-394
North-Holland

NOTICE

LETTER TO THE EDITOR

I.I. DIKIN
Siberian Energy Institute, Lermontov Street 130, Irkutsk 664033, USSR

Mathematical Programming 36 (1986) contains an article by E.R. Barnes [1], who investigates an algorithm for the solution of linear programming problems. That algorithm was proposed in my paper [2], written when I was a graduate student of L.V. Kantorovich (1967). Theorems 1.1 and 2.1 in [1] are corollaries of a theorem proved in a later paper of mine [3]. In [3] the convergence of iterations to the inner point in the set of optimal solutions of the nondegenerate problem was established, and the estimate of the convergence rate was given.

In [1], Barnes considers results of N. Karmarkar [6]. Karmarkar's method is a modification of the algorithm in [2].

In a number of papers by the present writer, it was shown how feasible and optimal solutions of energy problems of mathematical programming can be found with the help of the method presented in [2]. (See, e.g., [4, 5].)

I hope that the publication of this letter will be helpful for a clearer understanding of this interesting problem.

Editor's note

The fact that what has been called the affine (scaling) variant of Karmarkar's algorithm was proposed by I.I. Dikin over twenty years ago is certainly of great interest. Dikin's convergence results seem essentially equivalent to those of Barnes, but are obtained using different methods. It is perhaps misleading to call Karmarkar's algorithm a modification of Dikin's, since the former provides a polynomial time bound while the latter, to our knowledge, does not; in addition, Karmarkar's algorithm uses ideas of projective transformation and potential functions that do not arise in Dikin's method. We should point out that Dikin's algorithm was also independently rediscovered in at least references [A], [B] and [C].

References

[1] E.R. Barnes, *Mathematical Programming* 36 (1986) 174–182.
[2] I.I. Dikin, *Doklady Akademii Nauk SSSR* 174 (1967) 747–748.
[3] I.I. Dikin, *Upravljaemye Sistemy* 12 (1974) 54–60.
[4] I.I. Dikin, *Prikladnaja Matematiki Novosibirsk Nauka* (1978) 139–158.
[5] I.I. Dikin, *R.J. Math.* 5B (1979) 871.
[6] N. Karmarkar, *Combinatorica* 4 (1984) 373–395.

[A] T.M. Cavalier and A.L. Soyster, "Some computational experience and a modification of the Karmarkar algorithm," The Pennsylvania State University, ISME working Paper 85-105, 1985.
[B] K.O. Kortanek and M. Shi, "Convergence results and numerical experiments on a linear programming hybrid algorithm," *European Journal of Operations Research* 32 (1987) 47–61.
[C] R.J. Vanderbei, M.S. Meketon and B.A. Freedman, "A modification of Karmarkar's linear programming algorithm," *Algorithmica* 1 (1986) 395–407.