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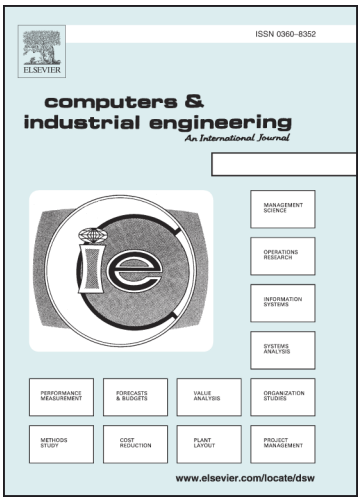

A powerful discriminative approach for selecting the most efficient unit in DEA

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A powerful discriminative approach for selecting the most efficient unit in DEA

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Abstract

Data envelopment analysis (DEA) is a mathematical approach deals with the performance evaluation problem. Traditional DEA models partition the set of units into two distinct sets: efficient and inefficient. These models fail to get more information about efficient units whereas there are some applications, known as selection-based problems, where the concern is selecting only a single efficient unit. To address the problem, several mixed integer linear/nonlinear programming models are developed in the literature using DEA. The aim of all these approaches is formulating a model with more discriminating power. This paper presents a new nonlinear mixed integer programming model with significantly higher discriminating power than the existing ones in the literature. The suggested model lets the efficiency score of only a single unit be strictly greater than one. It is observed that the discrimination power of the model is high enough for fully ranking all units. More importantly, a linearization technique is used to formulate an equivalent mixed integer linear programming model which significantly decreases the computational burden. Finally, to validate the proposed model and also compare with some recent approaches, two numerical examples are utilized from the literature. Our founding points out the superiority of our model over all the previously suggested models from both theoretical and practical standpoints.

Keywords: Data envelopment analysis; selecting a decision making unit; ranking; mixed integer linear program; selection-based problems.

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