USING GRAPHS TO ANALYZE SPORTS DRAFTS

C. Bryan Dawson

1. Introduction. Sports drafts involving two teams, like any two-player game, can very quickly become complicated to analyze because of the great number of moves that must be considered. Even small examples can cause difficulties. My personal experience with this came when I received a referee's report on the first draft of [1]. Much to my chagrin, I had incorrectly worked an example in the paper. Upon further examination, however, I discovered that the referee's alternative solution was also incorrect! The purpose of this paper is to offer a correct solution to the example with the help of graphs.

First, we need to know the assumptions under which the problem lies. In a general two-team draft, two owners are to pick teams of n players each from a pool of $m \geq 2n$ available players. We do not assume additivity of player values, that is, the value of a team is not necessarily the sum of the values of the individual players; therefore, we will place values on complete teams only. We assume that neither owner knows the other owner's evaluations of the possible teams, and these evaluations may be different. Finally, we assume that the owners will employ a conservative strategy, minimizing risk, rather than a gambling one. It is this last assumption that leads to the difficulties in analysis. For a more complete discussion of these assumptions, see [1].

There are two draft scenarios that we shall consider, leading to two different games. The first scenario is that the two owners will possess the only two teams in existence at the end of the draft. Your goal as an owner is to have a team that you value highly with respect to the other owner's team, i.e., to maximize the quantity

your evaluation of your team − your evaluation of the other owner's team.

The second scenario is that of an "expansion draft," where the two owners are joining a league that already has several other teams. Now, in order to compete with the other teams in the league, your goal as an owner is to maximize your evaluation of your team.

The example we consider is Example 2 from [1].

Example 2. Suppose O_1 and O_2 are to choose three-player teams from among A, B, C, D, E, and F, and the evaluations (e_1, e_2) by O_1 and O_2 of the possible