Towards a new method for team ranking in the Spanish football league

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1   Introduction

Sport rankings provide a structured framework that allows the evaluation of team performances and the determination of the standing of a team compared with the rest. The ranking offers a quantitative measure of success that has a direct impact in the club economy as well as in the capacity to engage audiences. In the case of ranking football (soccer) teams, the main data are obtained from the table league. For the first division of the Spanish football league (officially called *Campeonato Nacional de Liga Profesional Primera División*, that we will refer throughout the paper as LFP first division or simply LFP) the table league can be retrieved from [9]. To make the classification of the LFP first division, several factors are taken into account, including the point system (teams earn three points for a win, one point for a draw, and zero points for a loss), goal difference, goals scored, goals conceded, etc. (see [10]). One of the main features of the evolution of the LFP classification along the weeks is that one team remains in the first position for a great number of weeks. For example, in Table 1 we show the Top-6 teams corresponding to the last seven weeks of the 2022-23 LFP championship. In this table we see that F. C. Barcelona stayed in the first position along this period while R. Madrid and At. Madrid cross four times their standings (from week 32 to week 36).

Note that the LFP championship can be considered as a series of rankings, and this is the main point of view that we hold in this communication. In more detail, we use the Kendall's τ coefficient of disagreement (see [6], [7], [8]) to measure the evolution from ranking to ranking and the *evolutive Kendall's correlation coefficient* τ_e, introduced in [2], to assign a measure of *competitive balance* to a series of rankings.

In a recent work (see [4]) we compared the competitiveness of the Formula One World Championship (F1) and the LFP championship along ten years by using the Kendall corrected evolutive coefficient that was introduced in [5]. As one of the conclusions we remarked that the F1 system was more captivating than the LFP system because there were more movements in the Grand Prix (GP) standings (virtually any pilot can win a GP). As a consequence we recommended to follow a similar system for the LFP. That is, a ranking system that will allow any team to be on the first place, any week.

In this communication we present a method to rank the LFP, inspired by the F1 system, in such a way that any week we produce a ranking. We also produce a parallel general classification to be able to give a final ranking of the championship. We compare our method with the usual

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Table 1: Top-6 standings for the official 2022-23 LFP along the last seven weeks.

W. 32	W. 33	W. 34	W. 35	W. 36	W. 37	W. 38
Barcelona	Barcelona	Barcelona	Barcelona	Barcelona	Barcelona	Barcelona
Madrid	Atlético	Madrid	Atlético	Madrid	Madrid	Madrid
Atlético	Madrid	Atlético	Madrid	Atlético	Atlético	Atlético
R. Sociedad	R. Sociedad	R. Sociedad	R. Sociedad	R. Sociedad	R. Sociedad	R. Sociedad
Villarreal	Villarreal	Villarreal	Villarreal	Villarreal	Villarreal	Villarreal
Betis	Betis	Betis	Betis	Betis	Betis	Betis

LFP classification system. In making the comparisons we use techniques from the field of complex networks.

2   Methodology

When all the football fixtures for a particular match week are known, our method proposes to produce a rank of the teams following these rules:

- We first classify the teams in three groups: winning teams, tying teams, and losing teams, according to the result obtained in their respective matches.

- In each group we order the teams according to the goal difference (GD), such that higher positions correspond to higher GD's. If there is a tie in GD between two teams we give higher position to the team that has scored the maximum number of goals. If the tie still holds we give preference to the team that had better rank in the previous rank. For the first week we consider that the previous rank is the final classification of the previous LFP championship (ignoring the teams that were descended to second division and adding the teams that were promoted to first division).

- Finally, we stack the three obtained rankings by giving preference to winning teams, then tying teams, and finally, losing teams.

In addition, in order to obtain a general classification to be able to produce an accumulative ranking for the whole season, we assign points to the first ten ranked teams according to the rule inspired by F1 championships, shown in Table 2.

Table 2: Points scoring sharing.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
25	18	15	12	10	8	6	4	2	1

3   Results

In Table 3 we show the first 6 teams of the classifications produced with the proposed method along the last seven weeks of the 2022-23 LFP championship. At first sight, it is easy to note the great difference between these rankings and the official rankings given in Table 1. For example, in Table 1 only six teams appear, while in Table 3 a total of 19 teams contribute.

In order to give a quantitative comparison of these two classifications (for the whole set of 20 teams that participate in the league) we use the *evolutive Kendall's correlation coefficient* τ_e,

Table 3: Top-6 standings with the proposed method for the last seven weeks of 2022-23 LFP.

W. 32	W. 33	W. 34	W. 35	W. 36	W. 37	W. 38
Barcelona	Atlético	Villarreal	Atlético	R. Valladolid	Barcelona	Mallorca
Elche	R. Sociedad	Sevilla	Almería	Villarreal	R. Madrid	Osasuna
Atlético	Sevilla	Barcelona	Cádiz	Osasuna	Getafe	R. Sociedad
R. Madrid	Girona	Betis	Villarreal	R. Madrid	Atlético	Celta
Villareal	Almería	Osasuna	R. Sociedad	R. Sociedad	Rayo	Espanyol
Girona	Rayo	Valencia	Espanyol	Getafe	Betis	Almería

introduced in [2]. For practical reasons, is more useful to use the *Normalized Strength* coefficient (borrowed from complex networks terminology, see [2], [1]), and that we denote here by $NS = \frac{1-\tau_e}{2}$. It holds that NS is a normalized index, $NS \in [0, 1]$, and its value can be considered as a measure of competitive balance. The greater this value, the greater the movements in the standings, and therefore the greater the competitive balance among the teams. For F1 championships, the values of NS are of the order 0.24 (see [4]) while for European football leagues the values are of the order of 0.06 (see [2]). For the 2022-23 LFP championship we obtain the NS values shown in Table 4.

Table 4: Values of NS for season 2022-23.

Official ranking system	Proposed ranking system
0.059	0.4617

3.1 General clasification

The proposed method allows to obtain a general classification for the whole season by accumulating points according to the standings following the sharing shown in Table 2. In Table 5 we show the final ranking with the new method obtained by accumulating points in each week, and we also show the official top-10 final ranking, and points, for the LFP in season 2022-23.

Table 5: Comparison of the top-10 standings with the new method and the official LFP system for season 2022-23.

order	New method	points	LFP ranking	points
1	Barcelona	411	Barcelona	88
2	Real Madrid	376	Real Madrid	78
3	Atlético	364	Atlético	77
4	R. Sociedad	285	R. Sociedad	71
5	Villarreal	282	Villarreal	64
6	Betis	191	Betis	60
7	Athletic	187	Osasuna	53
8	Girona	178	Athletic	51
9	Sevilla	171	Mallorca	50
10	Osasuna	159	Girona	49

3.2   Competitivity graphs

Given a series of rankings we can produce a (competitivity) graph following the rule: two nodes are connected if the corresponding teams have crossed their positions in the classification (see [2], [3]). The weight of the corresponding edge accumulates the number of crossings along the considered series of rankings. In Figure 1 we show the competitivity graph corresponding to the six last weeks of the official LFP rankings. For the sake of clarity we have considered only the teams that appear in Table 5 . We can observe the four crossings that Atlético and Real Madrid show in Table 1.
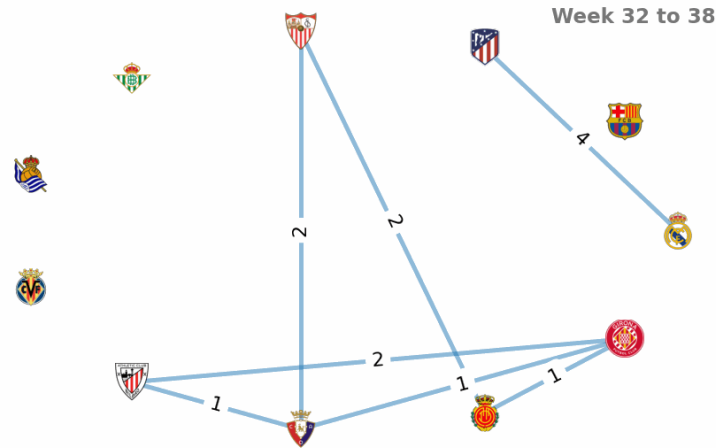

Figure 1: Competitivity graph for the last seven rankings of the official LFP season 2022-23.

In Figure 2 we show the corresponding competitivity graph when using the proposed method, for the same considered teams. These graphs show that the new method produces more movements in the standings, as we have remarked before by inspecting Table 1 and Table 3, and by computing the NS values.
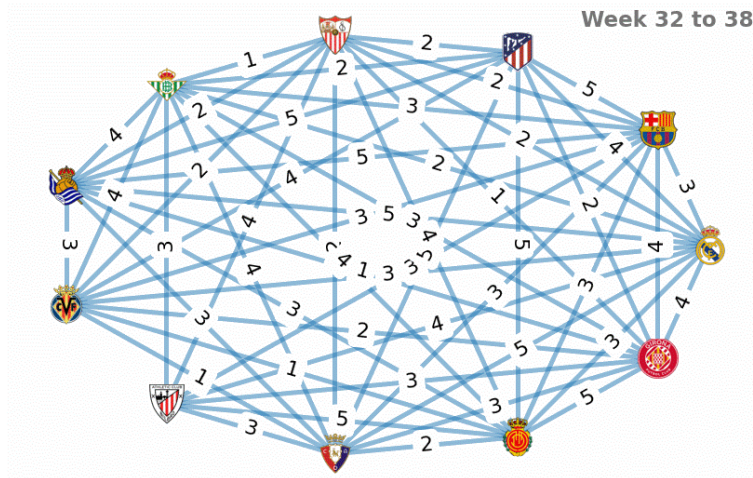

Figure 2: Competitivity graph for the last seven rankings produced with the proposed method.

4   Conclusions

We have proposed a new method to rank the teams in each week of the LFP championship. We have shown the results obtained when using the results of the fixtures corresponding to the season 2022-23 of the LFP. We obtain that the new method produces more movements in the rankings, since the coefficient NS (that measures competitive balance) is greater for the new method. It is also interesting to remark that the new method produces a final ranking that is very similar to the official final ranking for the studied season, when considering the ten first positions of the table. We have also shown the competitivity graphs corresponding to the last weeks of the championship to compare our method to the official method, and to visualize the differences in the movements of both series of rankings.

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