The Bronze constant: A study in calculating the escape velocity of the bronze division

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Abstract

Here we outline the idea of a "bronze constant" hereby represented as κ. This is point at which someone will constantly be in bronze, and never achieve the escape velocity necessary to enter the silver or higher divisions.

The bad team hypothesis

In our study we have found many players hindered by the bronze constant blame their bad team for their shortcomings. Anecdotal evidence is known to be some of the best so we have factored this into our study. We have found that the "bad team defense" tends to occur around the 900-1100 mmr range. Hence we can narrow down the bronze constant to within this region.

$$900 \leq \kappa \leq 1100 \tag{1}$$

Now we shall represent a team as a vector with 5 rows. Shown as follows

$$\begin{pmatrix} i_{top} \\ i_{jungle} \\ i_{mid} \\ i_{adc} \\ i_{support} \end{pmatrix} \tag{2}$$

taking the dot product of a team vector and the reciprical enemy team vector which is negative if the enemy player wins lane, gives a constant, which will predict the outcome of the game, positive for a win and negative for a loss. Now we simply need to find a representative vector that will cause an equilibrium between wins and losses, maintaining a players mmr. Here I represent the player by their mmr κ and give the team mmr within the κ-region. Here i also produce an enemy team with a representative mmr. We want to find the value of kappa, which occurs when the dot product of these is zero, giving the following equation.

$$\begin{pmatrix} 980 \\ 800 \\ \kappa \\ 920 \\ 1000 \end{pmatrix} \cdot \begin{pmatrix} -\frac{1}{985} \\ -\frac{1}{805} \\ \frac{1}{1100} \\ -\frac{1}{925} \\ -\frac{1}{1005} \end{pmatrix} = 0 \tag{3}$$

Note, this data is derived from our survey based on responses regarding the aptitude of the team the player is on and against. Here we see real data that their team is in fact, worse than the opponents, an incredible breakthrough. Now we find the value of κ.

$$-\frac{980}{985} - \frac{800}{805} + \frac{\kappa}{1100} - \frac{920}{810} - \frac{1000}{1005} = 0 \tag{4}$$

$$\frac{\kappa}{1100} = 3.978 \text{ (3dp)} \tag{5}$$

$$\kappa = 4376 \tag{6}$$

Here we witness a shocking result. we see that the bronze constant is not actually within the range set out in the introduction. We observe that the bronze constant is an mmr of 4376, meaning that challenger players are stuck in the bronze region of the ladder. This is obviously an oversight on the part of riot games. RIOT PLS

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