

MATH 341 HW 11 BY ANDREW KUNG

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1. ARTICLE SUMMARY

Exercise 1.1. Gill, Paramjit. "Late-Game Reversals in Professional Basketball, Football, and Hockey." *The American Statistician*, May 2000, Vol. 54, No. 2.

The author used data from the 1997-1998 seasons to model the outcome of professional basketball (NBA), football (NFL) and hockey (NHL) games based on the score at the beginning of the final period, looking particularly for reversal finishes, come-from-behind victories. The models were overall very successful in predicting the final outcomes.

NBA and NFL games were modeled with normal distributions. The scores of the two teams were modeled as a bivariate normal distribution, with the difference (lead) also following a normal distribution corrected for continuity, $N(2.6, 12.3)$ for NBA games and $N(2.1, 13.1)$ for NFL games. The outcomes of games were predicted using conditional probabilities: the probability of a given team winning the game given that they were leading by X points at the beginning of the final period. The impact of home-court/field advantage was studied taken into account. The model predicted and the data showed that the home teams were more likely to hold onto a lead, and also more likely to come from behind to win. NHL games were modeled with Poisson distributions, as they are low-scoring, with $Pois(1.770)$ for the home team and $Pois(1.694)$ for the away team. Conditional probabilities were used in a similar fashion. This article was written before shootout rules were implemented, so ties are taken into account.

Although there were no groundbreaking insights (the probability of winning increases as the lead at the end of the third quarter increases, the home team usually performs slightly better), it is interesting to see that a seemingly arbitrary concept from our daily lives modeled with basic probability. However, it seems like the predictive powers of these models are questionable, given that the data set consisted of games from one single season, and the models were created specifically for this set. Also, many simplifications were made, including treating all teams as homogeneous, with the specific abilities and shortcomings of individual teams not taken into account.

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Date: December 4, 2009.