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Statistical Analysis of Technical Characteristics of Eastern and Western Players in 2013 NBA All-star Game Based on MATLAB

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Abstract: Based on the technique statistics of 2013 NBA All-Star Game, this study uses MATLAB simulation software for statistical analysis, studies the score condition of eastern and western All-Star players in the All-Star game in shooting, three point shot, free throws, rebounds, assists, steals, block shots, turnovers, fouls and technical fouls and other aspects, finds out the lack and advantages of players in certain aspects, brings up the corresponding improvement direction and provides reference for coaches, athletes and related personnel in the comparative analysis of techniques.

Key words: MATLAB, NBA, technical characteristics, statistical analysis

INTRODUCTION

In the comprehensive and rapid development of modern basketball, the outcome of basketball depends on many factors: For example, the contrast of two sides' strength, the warm-up, the on-the-spot command, the venue, lighting, climate and the impact of the referee and the audience and so on (Wang, 2004). But the decisive factor is on one hand reflected in strength contrast of the two sides, including technique, tactic, will, the physical condition and psychological quality of players and competitions experience (Guo, 2005); on the other hand it is reflected in the strength using of both sides, including deployment and change of strategic and tactic, suspend and substitutions and the use of other techniques (Guo and Liu, 2005). The former belongs to specific performance of athletes on the court, while the latter is specific performance of coaches' on-the-spot commanding art. But these factors can be improved in peacetime training (Liu, 2012); in a game the most direct factor deciding the outcome is the final score (Wang and Yang, 2013). Each basketball team's score condition depends on the score condition of players in various technical aspects in the game, these aspects mainly include shooting, three-point shot, free throws, rebounds, assists, steals, block shots, turnovers, fouls, technical fouls and so on (Xie, 2011). Each individual players of the basketball team are also different in these areas, so for the score statistics of players in all aspects, we conduct software statistics and obtain the insufficient and preponderant side of each player, which is helpful for the future development of basketball (Li *et al.*, 2000).

In this study, it conducts detailed statistics on various factors affecting the result of 2013 NBA game (Xu, 2005); through detailed score statistics, the simulation using MATLAB software can present the specific impact of these factors on the results of the game. Meanwhile, we can see the strengths and weaknesses side of various players in these areas.

impact of various factors on the game: The technical statistics of 2013 NBA All-Star game is as follows.

In order to use MATLAB software to conduct simulation on the various indicators of all the players, all the players are numbered, as in Table 1 and 2 above.

Score: Basketball is one collective confrontation item, which takes shoot as the center for the purpose of scoring and decides success or failure by scoring how many points, Shown in Fig. 1 and 2.

Through these two score curves, the score gap of eastern and western players is large, indicating the strength of the players within the team have a big difference and the gap of western players is bigger compared to the eastern.

Basketball shot: Shooting is the core of the development of basketball and the hit rate of shooting is essential. In basketball game, the purpose of the offensive team using a variety of techniques and tactics is aiming at creating favorable shots and strive to score (Gu, 2013); the defending team actively defense in order to disrupt the other side's shots and strive from defensive to offensive, Shown in Fig. 3 and 4.

Table 1: Technical statistics of eastern all-star players

Players	Score	Basketball shot	Three-point shot	Penalty shot	Rebound	Assists	Steals	Block shots	Turnovers	Foul	Technical foul
LeBron-James	19	7-18	3-7	2-4	3	5	1	0	4	0	0
Chris-Bosh	6	3-9	0-3	0-0	2	1	1	0	3	3	0
Dwyane-Wade	21	10-13	1-2	0-0	3	7	2	2	4	2	0
Kevin-Garnett	0	0-2	0-0	0-0	3	1	0	0	1	0	0
Carmelo-Anthony	26	8-14	3-7	7-9	12	3	0	0	1	0	0
Jrue-Holliday	6	3-6	0-2	0-0	2	1	2	0	1	1	0
Paul-George	17	7-13	3-6	0-0	3	4	2	0	0	0	0
Tyson-Chandler	7	2-5	0-0	3-3	8	0	0	0	0	1	0
Brook-Lopez	3	0-1	0-1	3-4	5	3	0	0	1	1	0
Carey-Owen	15	6-11	3-6	0-0	3	4	0	0	2	1	0
Joakim-Noah	8	4-7	0-0	0-0	10	3	0	1	1	1	0
Raul-Deng	10	4-10	1-5	1-1	2	1	0	0	2	0	0
Total	138	54-109	14-39	16-21	56	33	8	3	20	10	0

Table 2: Technical statistics of western all-star players

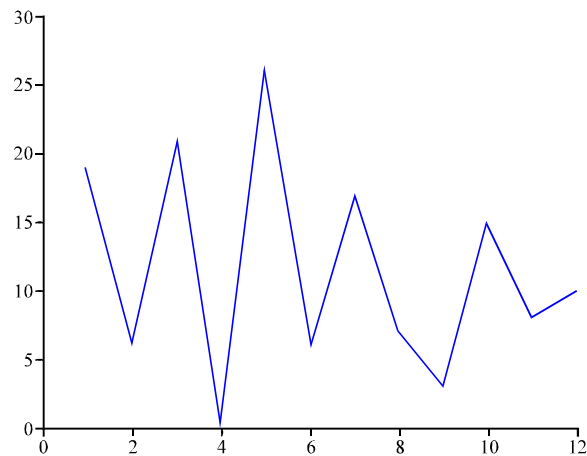| Players	Score	Basketball shot	Three-point shot	Penalty shot	Rebound	Assists	Steals	Block shots	Turnovers	Foul	Technical foul
LeBron-James	9	4-6	1-1	0-0	7	0	0	0	1	1	0
Chris-Bosh	30	13-24	3-8	1-1	6	1	2	0	0	3	0
Dwyane-Wade	9	4-9	0-3	1-2	4	8	2	2	1	2	0
Kevin-Garnett	19	9-11	0-0	1-2	3	3	2	1	0	3	0
Carmelo-Anthony	20	7-10	4-5	2-3	0	15	4	0	3	0	0
Jrue-Holliday	13	5-10	1-3	2-2	1	5	2	0	3	0	0
Paul-George	14	7-13	0-3	0-0	4	3	1	0	2	1	0
Tyson-Chandler	6	3-4	0-0	0-0	2	0	2	0	1	1	0
Brook-Lopez	6	3-6	0-0	0-0	5	0	0	0	0	0	0
Carey-Owen	2	1-4	0-1	0-0	3	0	0	0	1	1	0
Joakim-Noah	15	6-13	3-8	0-0	6	3	0	0	2	2	0
Raul-Deng	0	0-2	0-0	0-0	4	1	0	2	1	0	0
Total	143	62-112	12-32	7-10	45	39	15	5	15	14	0

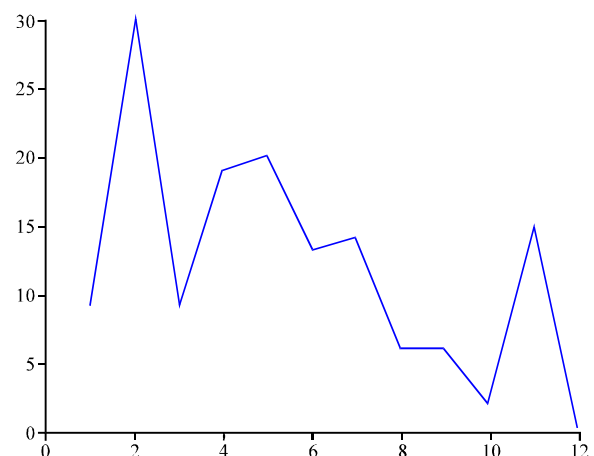Fig. 1: Score of eastern players

Fig. 2: Score of western players

By comparing these two graphs, the shooting accuracy rate of the eastern players is 49.5%, the accuracy rate of the western players is 55.36%; So, the shooting accuracy rate of the western players is higher than the eastern players. The green line represents the total number of players shooting; blue line shows the hit number of players shooting.

Three-point shot: It is apparent from the Figure that the three-point shot number of eastern players is larger than the western players but the hit number is relatively less; the total three-point hit rate of the eastern players is 35.9%, while the three-point hit rate of the western players is 37.5. So, in general, the three-point hit rate of the western players is higher than the eastern players, shown in Fig. 5 and 6.

In the drawings: The green line represents the total No. of three-point shots by players; the blue line represents the hit number of three-point field goals by players)
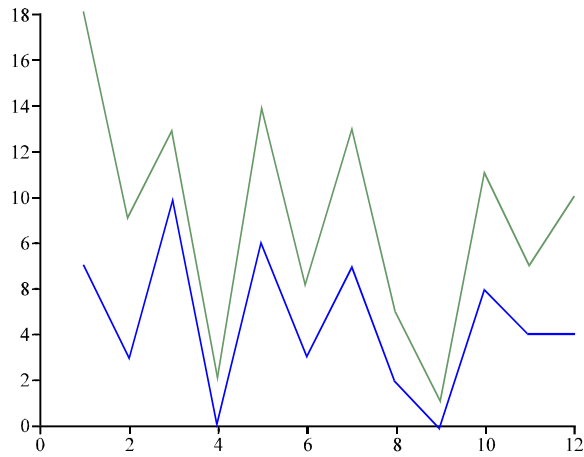
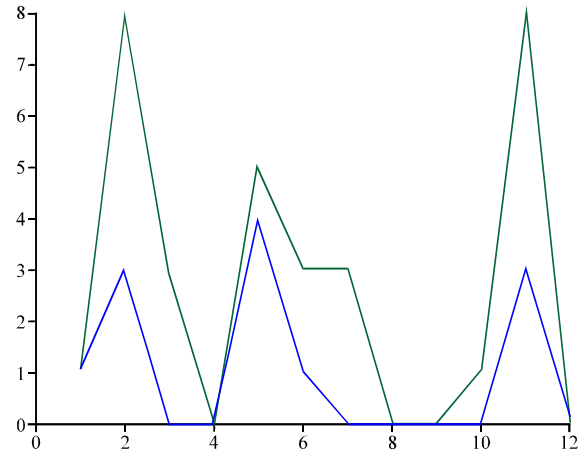Fig. 3: Basketball shot of eastern players

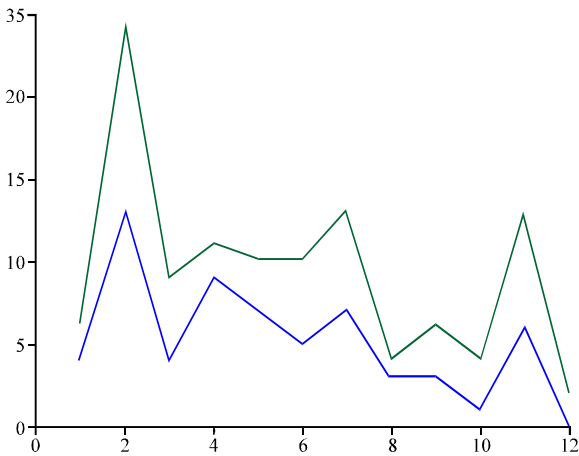Fig. 6: Three-point shot No. of western players

Fig. 4: Basketball shot of western players

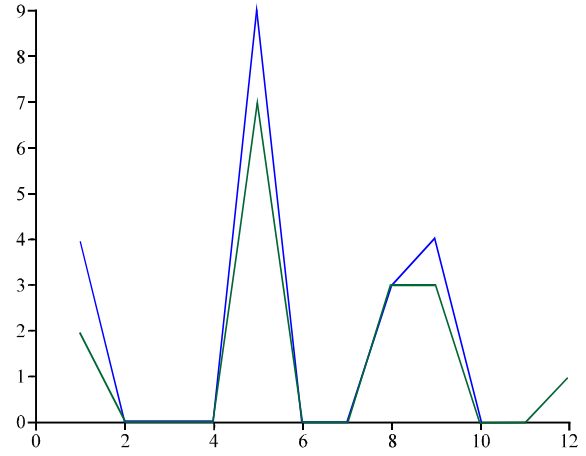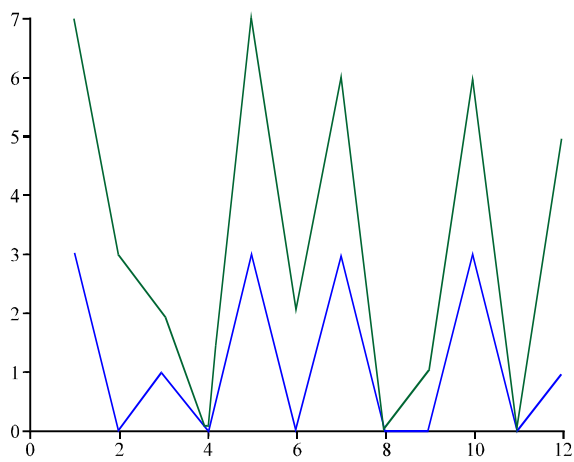Fig. 7: Penalty shot No. of the eastern players

Penalty shot: Physical fitness is a basis to complete the free throw technical action, which has a significant impact on the free-throw hit rate; the modern basketball game in high school has higher and higher requirements on the height, speed, endurance, confrontation and other aspects of the athletes, which makes the athletes' physical and mental load constantly rising, Shown in Fig. 7 and 8.

In the drawings: The green line represents the total No. of players' penalty shot; blue line indicates the free throws of players' penalty shot)

From the two diagrams we can obviously calculate that the free throw hit percentage of the eastern players is 76.19%, while the free throw hit percentage of the western players is 70.0%; so the free throw hit percentage of the eastern players is higher than the western players (Liu, 2013).

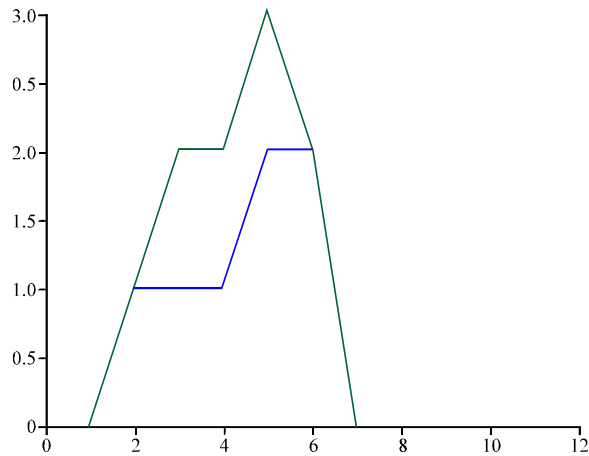Fig. 5: Three-point shot No. of eastern players

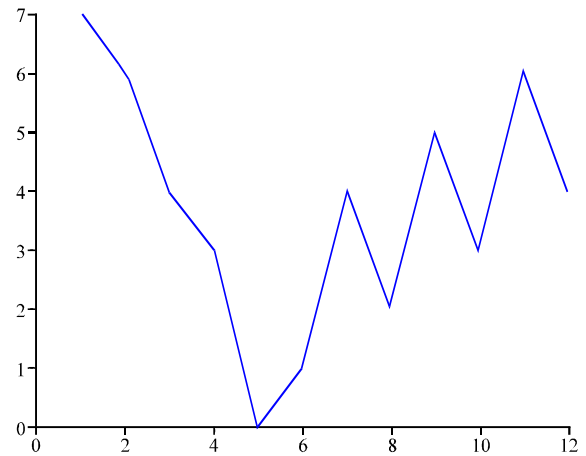Fig. 8: Penalty shot No. of the western players
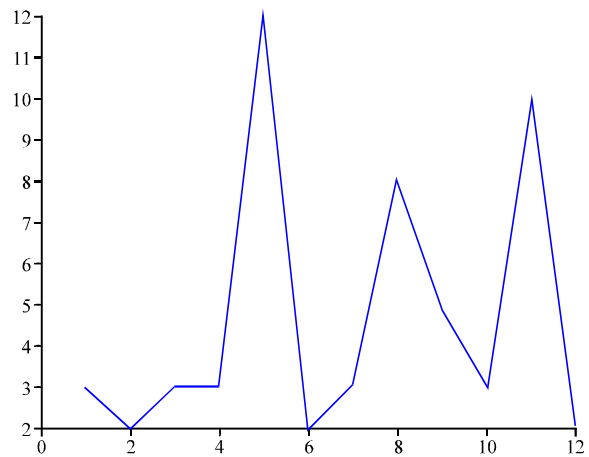

Fig. 10: Rebound No. of western players

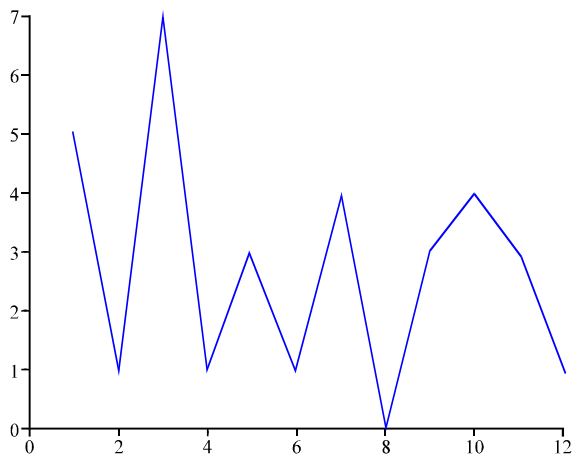Fig. 9: Rebound No. of eastern players

Fig. 11: Assists No. of eastern players

In peacetime training, we should combine free throw exercises with fitness training; and in a certain strength degree conduct shot training in a limited time and number, thus there is enough physical strength to ensure stable and improved shooting in intense competition. Thus, in peacetime training, we must attach importance to strengthen the athlete's physical fitness training intensity; only with a good physique for adequate safeguards, the players can always maintain high morale in the game, improve and maintain high-quality free-throw hit rate.

Rebound: The purpose of the game is to win and actively snatching fore court rebounds is one important way to achieve this goal, Shown in Fig. 9 and 10.

Seen from the two Figures the rebound number of eastern players is 56, the rebound number of western players is 45; but in the eastern players, the rebound number of individual players reaches12, also certain player only gets 2, indicating that the eastern players are significantly different in the strength of rebound. The overall rebound numbers of western players are almost similar, indicating the strength of the rebound are quite equal.

Assists: In basketball, assists and score is originally in the same strain, the purpose of assists is to better score and score using assists is much easier. However, personally by watching basketball games and participating in the basketball movement, we find that with the continuous development of basketball movement, the status of the two has undergone great changes, more and more people just focus on the score, while pay less attention on pass and assists. Through analysis and consulting information, we wish to analyze the reasons for this phenomenon and make our own proposals, so that it can develop towards a more rational direction, Shown in Fig. 11 and 12.

It is obvious from the Figure above, the assists number of eastern players is 33, the assists number of
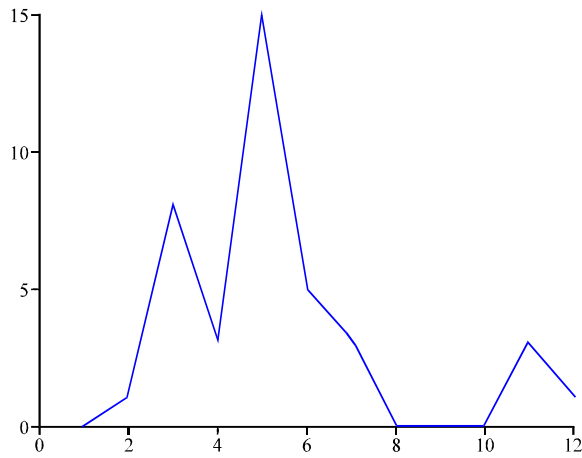
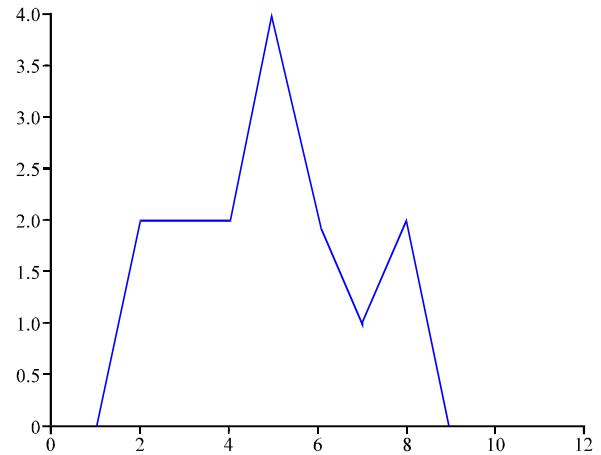Fig. 12: Assists No. of western players
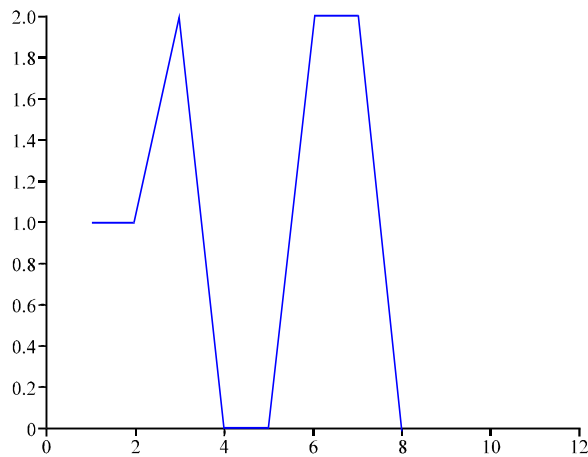

Fig. 14: Steals No. of western players
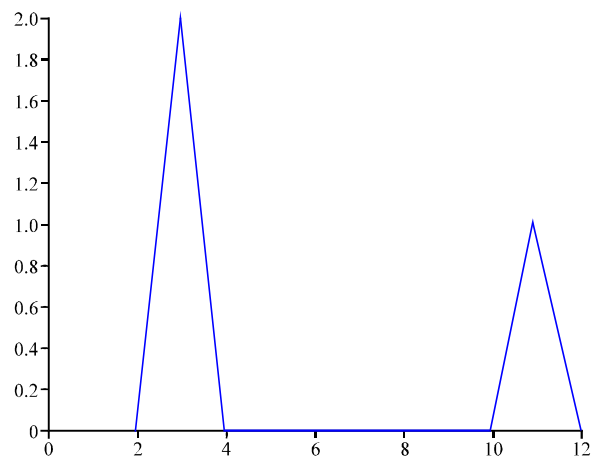

Fig. 13: Steals No. of eastern players

Fig. 15: Block shot No. of the eastern players

western players is 39, in this aspect the strength of the eastern and western players almost have no difference.

Steals: In this simulated war of modern basketball game, many of the world's top teams take improving defense capability as an important weapon to beat his opponent; it is solid defense system behind a strong attack. Steals technology is an important part of aggressive defense, because the ultimate goal of the defense is to acquire the possession of the ball and steals the ball is a direct method using actively defense and reasonable technical action to Fig. ht for control of the ball in the basketball game, Shown in Fig. 13 and 14.

For steals, the eastern players reach only 8 and western players reaches 15, indicating that the western players are doing better than the eastern players in aspect of steals.

Block shot: From the analysis of "block shot" technological structure, it consists of judgment,

taking-off, bouncing the ball in the air and landing and other techniques. It is a difficult defensive skill, also one of the commonly used techniques in the game, Shown in Fig. 15 and 16.

The block shot number of eastern players is 3; the block shot number of western players is 5, which is not very different for both players.

Turnovers: This article conducts a comprehensive analysis and discussion on fast break and mistakes passing and catching ball in basketball game; the different reasons of errors passing and catching ball in the launch and collusion phase of fast break, propulsion phase and end phase are mainly technical reasons, tactical awareness reasons, defensive reasons, psychological reasons, physical reasons and other reasons, Shown in Fig. 17 and 18.

The turnovers number of e astern players is 20 nd the turnovers number of western players
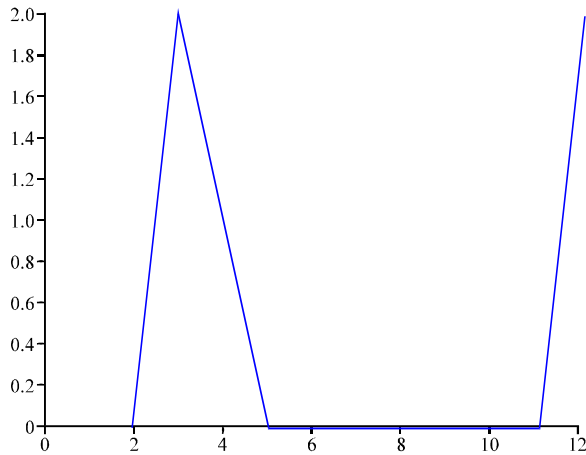
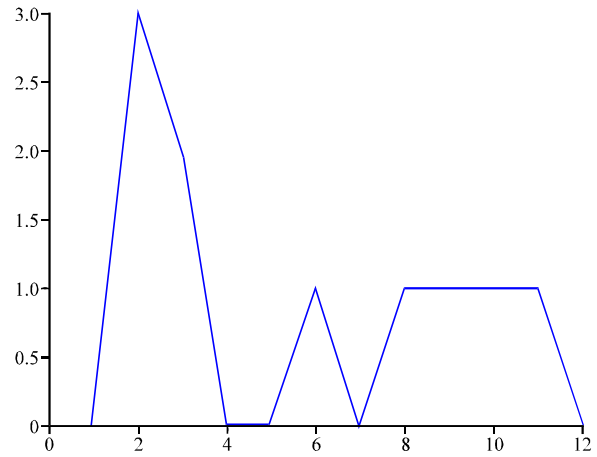Fig. 16: Block shot No. of the western players

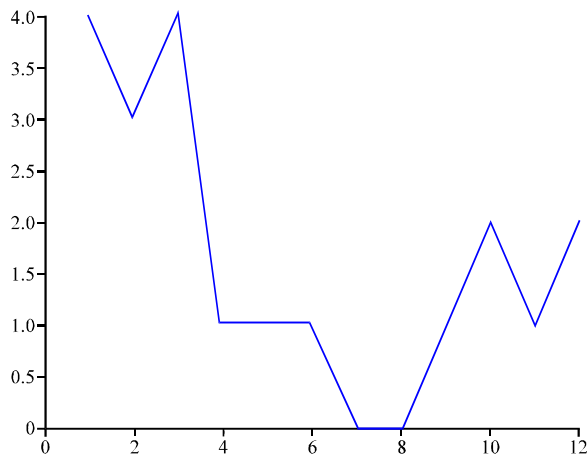Fig. 19: Fouls No. of eastern players

Fig. 17: Turnovers No. of eastern players

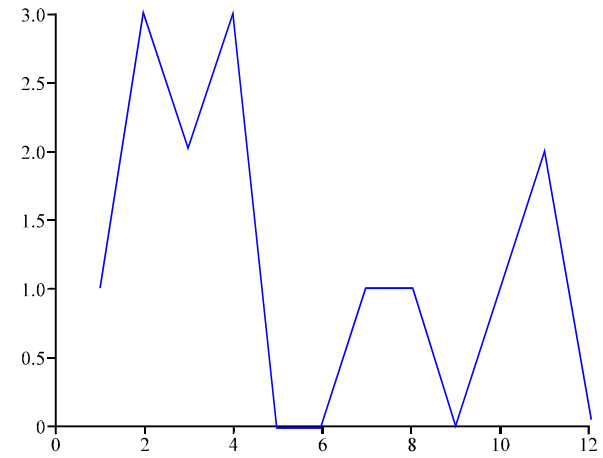Fig. 20: Fouls No. of western players

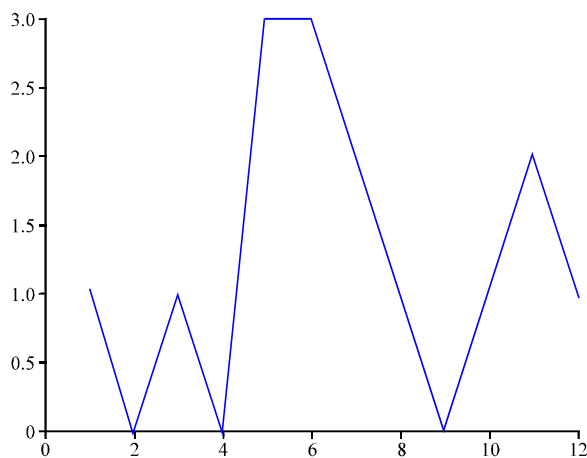Fig. 18: Turnovers No. of western players

Fouls: Foul refers to the behavior of players violate the rules in the game, including physical contact with other players or unsportsmanlike behavior. It includes personal foul and technical foul two categories. Foul players need to be registered, receive punishment followed by the rules of the relevant provisions. In a 2×20 min. game, once a player's personal foul or technical foul reaches five times or in a 4×12 min. game, once a player's personal foul or t echnical foul reaches six times, he must automatically quit the game after being notified. In a game, players have violated the rules but cause no foul, which is called "illegal", including running with the ball, illegal dribble, boxing ball, kicking a ball, the ball returned to the backcourt, the offensive and defensive goaltending, three seconds, five seconds, ten seconds, thirty seconds and throwing the ball out of bounds and bounds ball, free throw and jumping ball that violate rules. For a variety of illegal there are different processing and penalty provision, shown in Fig. 19 and 20.

is 15, on this point the eastern players are slightly worse than the western players.

The fouls number of eastern players is 10, the fouls number of western players is 14, which is not very different for both players.

CONCLUSIONS

This article specifically conducts a detailed statistics on the various factors affecting the competition results of 2013 NBA game, these factors include shooting, three-point shot, free throws, rebounds, assists, steals, block shots, turnovers, fouls and technical fouls, etc. Through these detailed score statistics and detailed simulation using MATLAB software, we can clearly see the impact of these factors on the results of the competition. Meanwhile, from the simulation Figure it can be clearly seen that the strengths and weaknesses of the various eastern and western players in these areas, which provides some necessary reference data for each basketball player on the future basketball road and helps player to improve his own strength. At the same time, it also provides the necessary reference for Chinese players; the gap between Chinese players and foreign players can be seen and Chinese players should play their strengths on the basketball court and strive to play the beautiful game. Meanwhile, we hope that Chinese basketball players can train harder and bring brilliance for the Chinese basketball career.

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