

## **Assessing The Best Track And Field Performances From East To West: Is Sky The Limit?: 2107 4:15 PM - 4:30 PM**

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Assessing the limits of human athletic performance has been a very attractive topic not only to scientists but also to common people. Human being has been running faster and faster and jumping higher and higher through the world from east to west. Especially in last two decades, the best track and field performances in the Far East countries such as China and Korea have been improving dramatically. One is always wondering whether this trend would continue and when is the end. Is sky the limit for improving the track and field performances? There is little research in the literature to assess the trend of the track and field performances of the east and west countries. A suitable procedure is real demand for the assessment of the limits of human athletic performances.

### **PURPOSE**

(1) to find an appropriate procedure to assess the limits of human track and field performances, (2) to examine the trend of the best track and field performances in Far East (China and Korea) and to compare the Far East best performances with the world best performances, and to investigate whether sky is really the limit.

### **METHODS**

Both the male and female best annual performance data of the four selected events over the last three decades (800 meters, 1500 meters, Marathon, and high jump) were used. The annual best performances were recorded based on Chinese, Korean, and world athletes' competitions in national and international levels. Different nonlinear regression models (polynomial and exponential models) and the autoregressive integrated moving average model (ARIMA) in time-series analysis were used to fit the male and female data separately. In the nonlinear model, the best performance is dependent variable and the chronicle year is the independent variable. The best fitting models were identified to explain whether the selected track and field events at Chinese, Korean and international levels have reached an asymptotic level (a stationary time series).

### **RESULTS**

For both male and female performances, the exponential model was the best fitting model in all the selected events. An asymptotic level has been achieved in all the selected events at both the east country (China and Korea) and international competitions. An ARIMA(0.0.0) model was identified for the last two decades data.

### **CONCLUSION**

(1) Using the exponential nonlinear regression model and ARIMA time series model is a valid procedure to assess the track and field best performance data. (2) The waiting time to establish new records would be considerably longer in future, and it may show a random phenomenon.