Monitoring and Evaluation of Average Performance Level per Session (APLS) in Athlete Preparation

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Abstract

Athlete preparation requires rigorous performance monitoring to adapt training to the objectives and abilities of each individual. This article presents a mathematical model for evaluating an athlete's progress by calculating the Average Performance Level per Session (APLS), allowing a comparison between an athlete's average performance and a predefined target. The APLS is obtained by averaging performances over a set number of sessions, then comparing this value to a benchmark goal to determine whether expectations are exceeded, met, or unmet. This method offers accessible and concrete athletic performance tracking, facilitating better training plan adjustments.

Keywords

Athletic Performance, Average Performance, Performance Monitoring, Training Adaptation

Introduction

In athlete preparation, continuous performance analysis is crucial to adjusting the intensity of training sessions and ensuring goal achievement. Numerous performance indicators exist, but not all are easily applicable or interpretable for athletes and coaches. The concept of Average Performance Level per Session (APLS) provides a simple, data-based solution for regularly assessing an athlete's performance. This method offers a quantifiable and adaptable tool to track athlete progression over sessions.

Methodology

Data Collection

During each session, an athlete's performance for a specific metric is recorded. For instance, in weightlifting, this could be the weight lifted or the number of repetitions for a given exercise; for a runner, it could be the distance covered or average speed. These data, collected over a defined number of sessions, are essential to establishing an average.

Calculation of Average Performance per Session (APS)

All variables mentioned hereafter belong to R. The Average Performance per Session, denoted as APS, is obtained by taking the sum of the performances achieved in each session, noted as a, then dividing by the total number of sessions, n:

$$APS = \frac{a}{n} \tag{1}$$

Where:

$$\mathbf{a} = \sum_{i=1}^{n} P_i \tag{2}$$

• P_i is the performance achieved in the *i*-th session.

Definition of Performance Goal

A performance target (reference constant) is set in advance according to the expectations for the season or training period. This target corresponds to the average performance the athlete aims to meet or exceed. We denote this target as constant b.

Calculation of Average Performance Level per Session (APLS)

Let x > 1 and z be a variable taking the value -1 or 1.

If in the athlete's objectives P_x is expected to be greater than or equal to P_1 , or the expected performance metric is greater than or equal to the constant b, then :

$$z = 1$$
 (3)

If in the athlete's objectives P_x is expected to be less than or equal to P_1 , or the expected performance metric is less than or equal to the constant b, then :

$$z = -1 \tag{4}$$

The APLS is a score quantifying the difference between the average performance achieved and the target. By convention, 100 is added to the result for easier interpretation:

$$APLS = \frac{az}{n} - bz + 100 \tag{5}$$

If the APLS is greater than 100, this indicates that the athlete has exceeded expectations. Conversely, a value below 100 indicates a performance level below expectations.

Application Example

Let's consider an athlete in powerlifting whose initial bench press is 100 kg. The athlete's goal is to achieve a bench press of 120 kg by the 52nd week (assuming one training session per week). The training method (which will not be discussed here, as this method is intentionally simplified and not optimal for this example) involves progressing linearly by 390 grams each session. By applying this method :

$$b = 390$$
 (6)

After the session in week 30, we decide to analyze the athlete's Average Performance Level Score (APLS). We collect the data and :

$$APS = 418 \tag{7}$$

We note that the athlete's objectives P_x are expected to be greater than or equal to P_1 , so :

$$z = 1$$
 (8)

By applying the formula, we get :

$$APLS = 128 \tag{9}$$

In this case, an APLS of 128 indicates that the athlete has exceeded the initial goal, representing positive progress.

Results and Discussion

The use of the APLS enables coaches and athletes to track progression quantitatively. This method also allows for the identification of periods of stagnation or regression, where the APLS might decrease due to insufficient training intensity, accumulated fatigue, or injury. An APLS below the target over several sessions may thus motivate adjustments in training planning.

Furthermore, analyzing APLS variations can help prevent overtraining. An APLS above 100 over an extended period is generally positive, though an excessive increase might also indicate an overload risk, and thus exhaustion.

Conclusion

The APLS is an effective and easily calculable indicator for assessing an athlete's progression over sessions. These measures simplify performance monitoring, enabling coaches to adjust training to each athlete's individual goals.

References

• Halson, S. L. (2014). Monitoring training load to understand fatigue in athletes. *Sports Medicine*, 44(S2), 139-147.