Relative Training Load - Mathematical Definition

1. Define the basic variables

Let: - TL_t = Training Load of the session at day t (from Garmin) - D_t = Distance of session at day t - T_t = Duration of session at day t - HR_t = Average heart rate or other intensity measure of session at day t

1. Recent history metrics

Define a rolling window of the last n sessions or n days.

• Recent Average Load over n sessions:

$$\overline{TL}_t^{(n)} = \frac{1}{n}\sum_{i=1}^{n} TL_{t-i}$$

• Recent Peak Load over n sessions:

$$TL_{\max}^{(n)} = \max(TL_{t-1}, TL_{t-2}, \ldots, TL_{t-n})$$

• Relative Training Load metrics

a) Relative to recent average:

$$RTL_{\text{avg},t} = \frac{TL_t}{\overline{TL}_t^{(n)}}$$

b) Relative to recent peak:

$$RTL_{\text{peak},t} = \frac{TL_t}{TL_{\max}^{(n)}}$$

1. Combining metrics (optional)

Composite normalized metric RTL^{*}_t:

$$RTL_t^* = \alpha \cdot RTL_{\text{avg},t} + (1-\alpha) \cdot RTL_{\text{peak},t}$$

Where 0 \le \alpha \le 1 controls the weight between baseline adaptation and peak stress.

1. Applying to other metrics

The same formulas can be applied to: - Distance: D_t - Duration: T_t - Heart rate zones or other intensity metrics: HR_t

This allows calculation of multiple relative load metrics that can later be combined for a comprehensive view.