## **Volume-Weighted RSI (VW-RSI) Technical Write-Up**

##### **Purpose**

The **Volume-Weighted RSI (VWRSI)** is a modification of the standard RSI (Relative Strength Index).

* Traditional RSI uses only price changes to measure momentum.
* VWRSI incorporates **volume** into the calculation, giving more weight to periods with higher trading activity.
  + This makes catching trends easier than having to manually cross-reference Volume with Relative Strength.
  + VW-RSI also helps to limit false positives.
* This makes VWRSI more adaptive in markets where volume is an important driver of price action (e.g., crypto, stocks with varying liquidity).

##### Core Calculation

The script modifies RSI by weighting gains and losses with **volume** before smoothing.

**Formula Steps:**

1. **Calculate price change (Δ close)**
   * Positive changes = gains
   * Negative changes = losses
2. **Volume-weighted moving averages (VW-RMA)**
   * Instead of a simple/EMA of gains/losses, it uses:

VW-RMA(x,length)=RMA(x⋅Volume,length)RMA(Volume,length)\text{VW-RMA}(x, length) = \frac{RMA(x \cdot Volume, length)}{RMA(Volume, length)}VW-RMA(x,length)=RMA(Volume,length)RMA(x⋅Volume,length)​

* + This ensures days with higher trading volume have a larger influence.

1. **Compute RSI ratio**

RSI=100−1001+VW\_UpVW\_Down\text{RSI} = 100 - \frac{100}{1 + \frac{VW\\_Up}{VW\\_Down}}RSI=100−1+VW\_DownVW\_Up​100​

* + VW\_Up = average of positive price changes weighted by volume
  + VW\_Down = average of negative price changes weighted by volume

##### **Visualization (2D Style)**

The indicator is designed with a **clean, professional 2D layout** for clarity:

* **Main RSI Line**
  + Plotted in **green** above 50 (bullish momentum)
  + Plotted in **red** below 50 (bearish momentum)
* **Optional RSI Moving Average (RSI MA)**
  + Helps smooth RSI fluctuations
  + Type selectable: EMA, SMA, RMA, or WMA
  + Color customizable
* **Bands & Zones**
  + **70–100** → Overbought zone (shaded red)
  + **30–0** → Oversold zone (shaded green)
  + **50** → Midline reference

This gives a quick visual of momentum strength, trend direction, and reversal zones.