VEV-bottom anchor: a compact numerical coincidence

A short N-style observation connecting the electroweak VEV, bottom, Higgs, and top-bottom scale.

Observation

Define the simple anchor:

$$A_{vb} = v + m_b,$$

where v is the electroweak Higgs vacuum expectation value in the standard 246 GeV convention, and m_b is the bottom-quark mass scale. Using representative values:

$$v = 246.21965 \text{ GeV}, \qquad m_b = 4.18 \text{ GeV}, \qquad A_{vb} = v + m_b = 250.39965 \text{ GeV}.$$

Two compact relations

The same anchor gives two nearby Standard-Model mass combinations:

Relation	Numerical value	Reference comparison	Deviation
$A_{vb}/2$	125.199825 GeV	$m_h \approx 125.25$ GeV	-0.050175 GeV (-0.040%)
$A_{vb}/\sqrt{2}$	177.059291 GeV	$m_t + m_b \approx 176.750$ GeV	$+0.309291$ GeV ($+0.175\%$)

Equivalently, the coincidence can be written as:

$$m_h \approx \frac{v + m_b}{2}, \qquad m_t + m_b \approx \frac{v + m_b}{\sqrt{2}}.$$

Top-quark rearrangement

Solving the second relation for the top-quark mass gives:

$$\boxed{m_t \approx \frac{v + m_b}{\sqrt{2}} - m_b}$$

or, equivalently,

$$\boxed{m_t \approx \frac{v}{\sqrt{2}} + m_b \left(\frac{1}{\sqrt{2}} - 1 \right)}.$$

With the same inputs,

$$m_t \approx \frac{246.21965 + 4.18}{\sqrt{2}} - 4.18 = 172.879291 \text{ GeV}.$$

Compared with the representative value $m_t \approx 172.57$ GeV, the deviation is

$$+0.309291 \text{ GeV} \quad (+0.179\%).$$

Interpretive note

This is not presented as a derivation of the Higgs or top mass. It is a compact numerical observation: the single anchor $v + m_b$ simultaneously lies close to $2m_h$ and to $\sqrt{2}(m_t + m_b)$. In N-style language, it may be recorded as a candidate electroweak-bottom anchor to compare with other mass anchors such as $2m_W + m_Z$.

Caveats

The bottom-quark mass is scheme- and scale-dependent, and the top-quark mass convention matters. Therefore the numerical proximity should be treated as a phenomenological coincidence or mnemonic unless a deeper mechanism is supplied.

Representative inputs used here: $v = 246.21965$ GeV, $m_b = 4.18$ GeV, $m_h = 125.25$ GeV, $m_t = 172.57$ GeV.