

»PHYSWIKIQUIZ« CHALLENGES

RIGHT-HAND SIDE SUBSTITUTIONS

- Centripetal acceleration: $a_C = \frac{v^2}{r}$
→ The index a_C is not supported.
- Conservation of energy:
 $E_{\text{tot},1} = E_{\text{tot},2}$
→ The indices $_{\text{tot},x}$ are not supported.
- Dirac equation in curved spacetime: $i\gamma^a e_a^\mu D_\mu \Psi - m \Psi = 0$
→ The formula right-hand side (rhs) already set zero, the left-hand side (lhs) is not a single identifier.
- Elastic energy: $U = \frac{1}{2} k \Delta x^2$ with identifier properties
[('spring constant', 'k'), ('linear strain', '\Delta x'), ('elastic energy', 'U')]
→ The identifiers are in wrong order, 'spring constant' k is interpreted as lhs.
- Energy-momentum relation: $E^2 = p^2 c^2 + m^2 c^4 \rightarrow c^4 m^2 + c^2 p^2 \rightarrow 62426$
→ Very large number, lhs is identifier squared.
- Escape velocity: $v_{\text{e}} = \sqrt{\frac{2GM}{r}} = \sqrt{2gr}$
→ Two equation signs = occur.
- Euler-Lagrange equation:
 $\frac{d}{dt} \left(\frac{dL}{dq} \right) = \frac{dL}{dq}$
→ The lhs is a complex expression.
- Force: $F = \frac{dp}{dt}$
→ Identifier properties and formula are not matching.
- Four-momentum: $p^\mu = \begin{matrix} \end{matrix}$...
→ Matrix cannot be calculated, formula too general depending on index dimension.
- Galilean transformation:
 $(t, \mathbf{x}) \mapsto (t+s, \mathbf{R}\mathbf{x} + \mathbf{vt} + \mathbf{y})$
→ The operator 'mapsto' is not supported, two variable transformation.
- Generalized momentum: $p_i = \frac{dL}{dq_i}$
→ The $\dot{}$ derivative is not supported.
- Hamiltonian operator: $H(q,p,t) = p \cdot \dot{q} - L(q, \dot{q}, t)$
→ Function arguments like () or $\left(\right)$ are not supported.
- Rest mass: $E_{\text{total}} \rightarrow \{E, t, o, t, a, l\}$
→ Translation of index letters into identifiers.
- Tangential velocity: $v = \omega r$
→ Identifier ω is v in identifier properties list.
- Work: $A = \int_{\Gamma} F \cdot dr$
→ Integral semantic index used instead of boundaries (interpreted as lower limit with upper missing).

EXPLANATION TEXT GENERATION

- Energy-momentum relation: Solution from www.wikidata.org/wiki/Q103439852 formula $E^2 = p^2 c^2 + m^2 c^4$
with $10100 \text{ m}^2 \text{ kg s}^{-2} = 2 \text{ m kg s}^{-1}^2 + 4 \text{ kg}^2 \text{ m s}^{-1}^4$.
→ Implicit multiplication operators, square power operator brackets missing.
- Hooke's law: Solution from www.wikidata.org/wiki/Q170282 formula $F = k X$
with $40 \text{ m kg s}^{-2} = 4 \text{ kg s}^{-2} 10 1$.
→ Unit of dimensionless identifier X set to 1.
- Mass-energy equivalence: Solution from www.wikidata.org/wiki/Q35875 formula $e = m c^2$
with $e = 1 \text{ kg } 10 \text{ m s}^{-1}^2$.
→ Rhs value missing, square power operator brackets missing.
- Mechanical impedance: Solution from www.wikidata.org/wiki/Q6421317 formula $Z_m = Z_a A^2$
with $Z_m = Z_a 8 \text{ m}^2$.
→ Identifiers with indices not evaluated.
- Moment of inertia: Solution from www.wikidata.org/wiki/Q165618 formula $J_Q = \int r_Q^2 dm$
with $J_Q = \int r_Q^2 d 7 \text{ kg}$.
→ Rhs and integral not evaluated.