ECE - The Theory of Everything

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Field Equations of

Geometry:

$$\boxed{D \wedge T = R \wedge q}$$

Electrodynamics:

$$\boxed{D \wedge F = R \wedge A}$$

Gravitation/dynamics:

$$\boxed{D \wedge G = R \wedge Q}$$

Fluid dynamics (aether):

$$\boxed{D \wedge F_{\mathrm{fd}} = R \wedge v}$$

Quantum mechanics (wave equation):

$$\boxed{\left(\Box + R\right)\psi = 0}$$

D: derivative operator

$\wedge$: antisymmetric multiplication operator (wedge)

T: torsion

R: curvature

q: tetrad

F: electromagnetic field

A: electromagnetic potential

G: gravitational or acceleration field

Q: gravitational or dynamics potential

F_{fd}: fluid dynamics field

v: fluid velocity

$\square$: Laplace operator

ψ: wave function

Theorems of Cartan geometry

First and second Maurer-Cartan structure equations:

$$\boxed{T = D \wedge q}$$
$$\boxed{R = D \wedge \omega}$$

Tetrad postulate:

$$\boxed{Dq = 0}$$

Evans lemma (wave equation):

$$\boxed{(\square + R)\, q = 0}$$

Cartan-Bianchi identity:

$$\boxed{D \wedge T = R \wedge q}$$

Alternative Cartan-Bianchi identity:

$$\boxed{D\widetilde{T} = \widetilde{R}}$$

Cartan-Evans identity:

$$\boxed{D \wedge \widetilde{T} = \widetilde{R} \wedge q}$$

Alternative Cartan-Evans identity:

$$\boxed{DT = R}$$

ω: spin connection

$\sim$: Hodge-dual operator