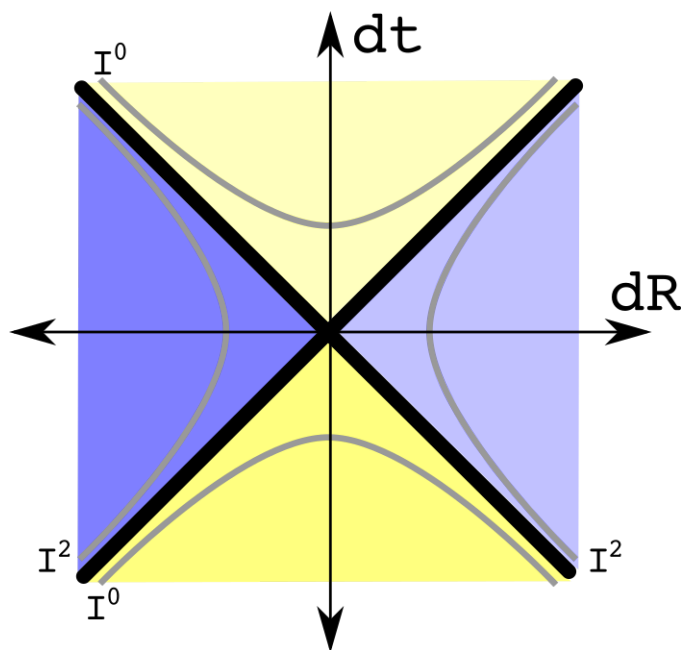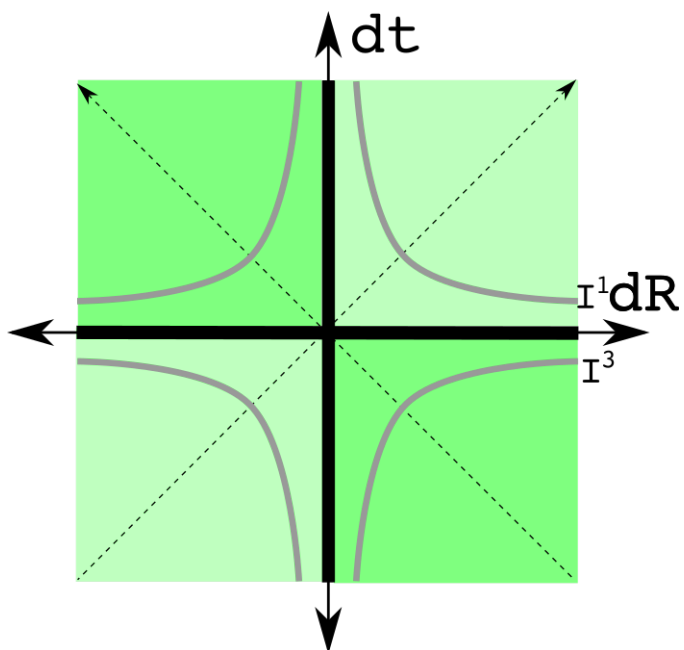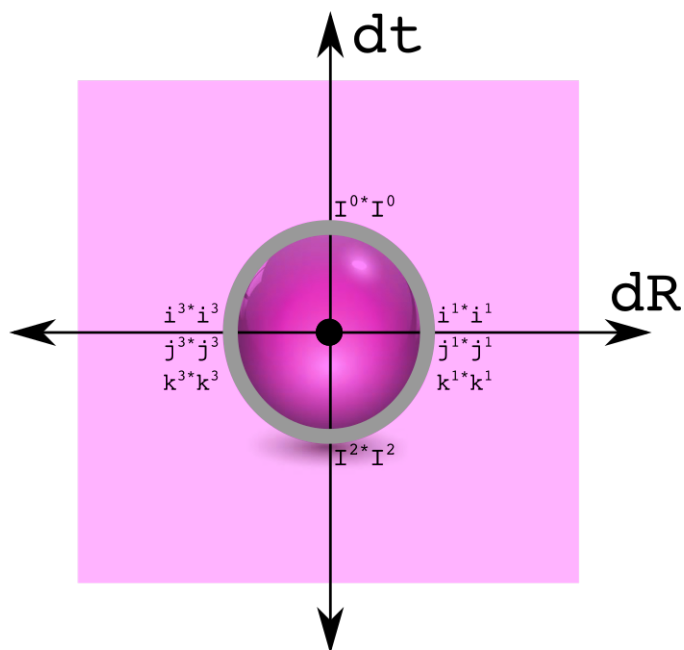**Classical**

Fast Physics
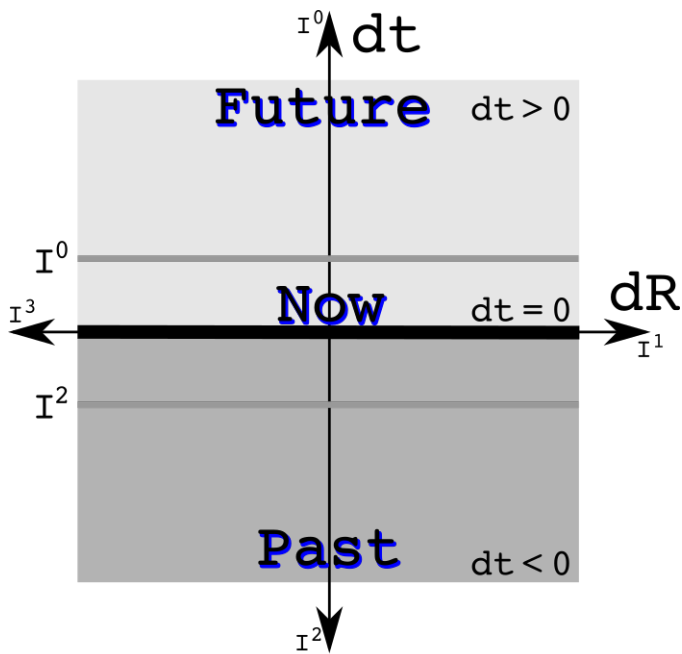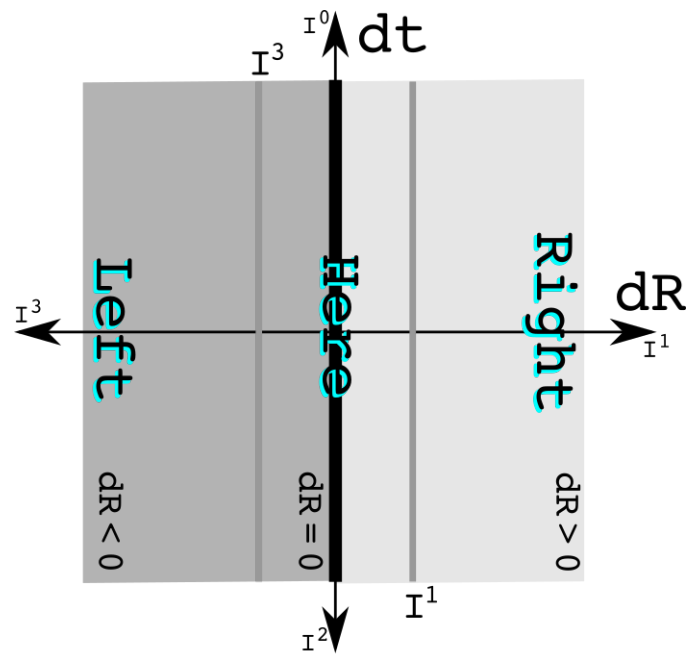
Gravity

Light +

Space-time Geometries

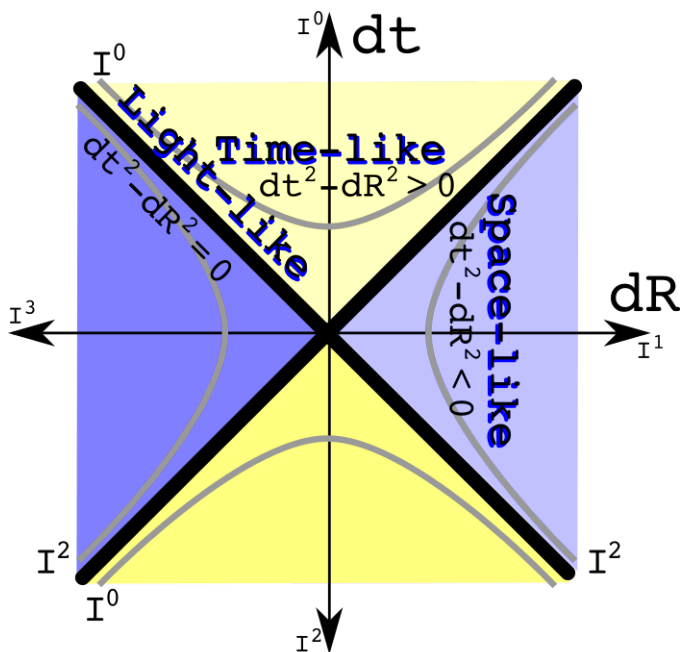# Space-Time Equivalence Classes

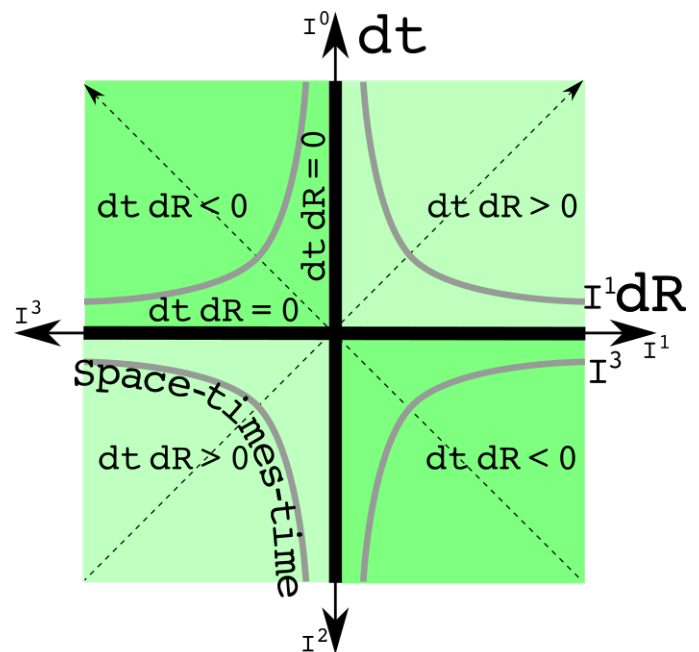**Time**
dt

Space
dR

Causality
$dt^2 - dR^2$

Gravity
$dt\,dR$

Space-Time Equivalence Classes

I^0 $\uparrow$ dt

$dt^2 + dR^2 > \{I^{0*}I^0, I^{2*}I^2\}$

$I^{0*}I^0$

I^3 $\longleftarrow$ dR $\longrightarrow$ I^1

U(1)

$I^{2*}I^2$

$dt^2 + dR^2 < \{I^{0*}I^0, I^{2*}I^2\}$

$dt^2 + dR^2 = \{I^{0*}I^0, I^{2*}I^2\}$

I^2 $\downarrow$

Light U(1)
$dt^2 + dR^2$

I^0 $\uparrow$ dt

$dt^2 + dx^2 + dy^2 + dz^2 > \{i^{1*}i^1, i^{3*}i^3, ...\}$

SU(2)

I^3 $\longleftarrow$ dR $\longrightarrow$ I^1

$i^{3*}i^3$ $\qquad$ $i^{1*}i^1$
$j^{3*}j^3$ $\qquad$ $j^{1*}j^1$
$k^{3*}k^3$ $\qquad$ $k^{1*}k^1$

$dt^2 + dx^2 + dy^2 + dz^2 < \{i^{1*}i^1, i^{3*}i^3, ...\}$

$dt^2 + dx^2 + dy^2 + dz^2 = \{i^{1*}i^1, i^{3*}i^3, ...\}$
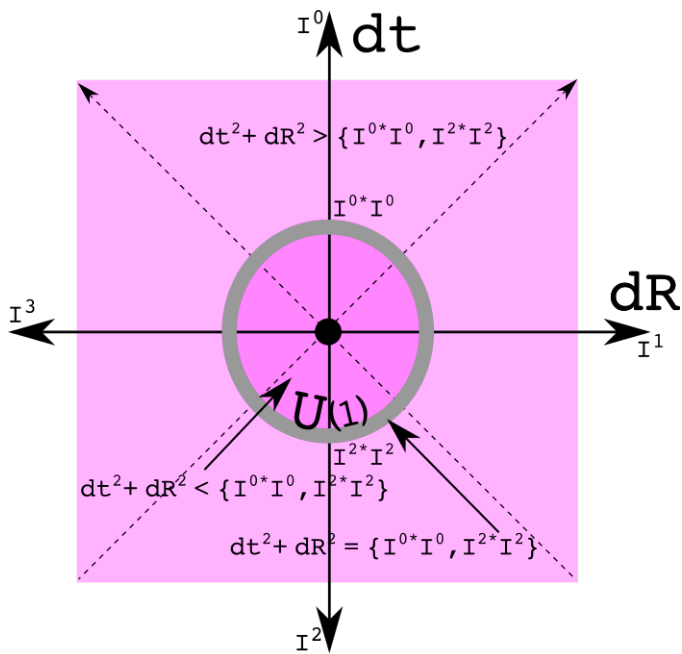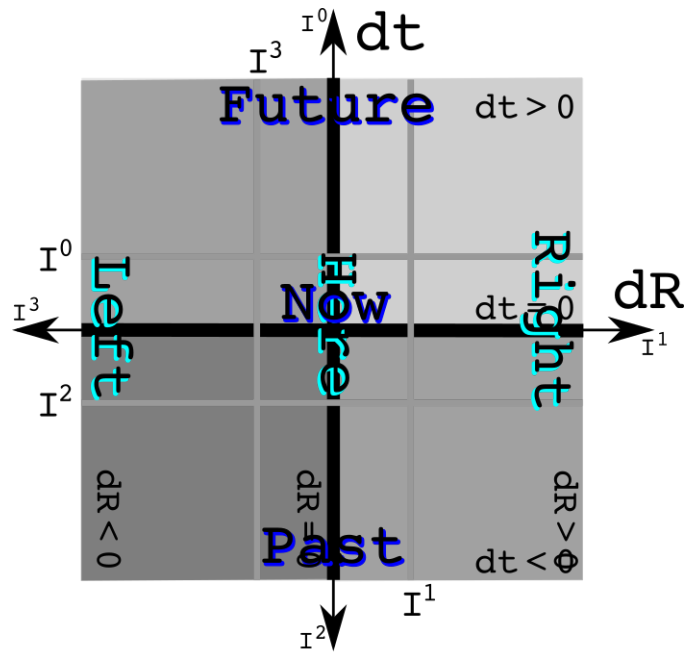
I^2 $\downarrow$
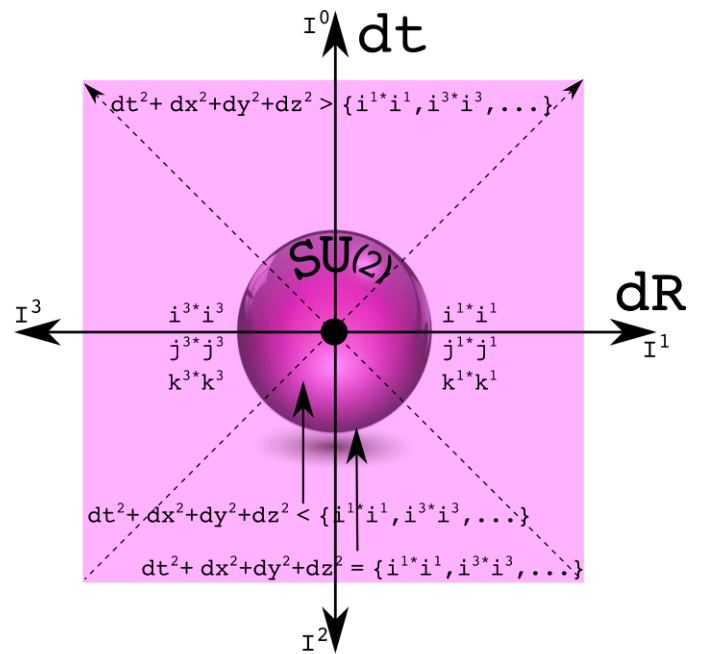
Weak Force SU(2)
$dt^2 + dx^2 + dy^2 + dz^2$

Overlapping Equivalence Classes
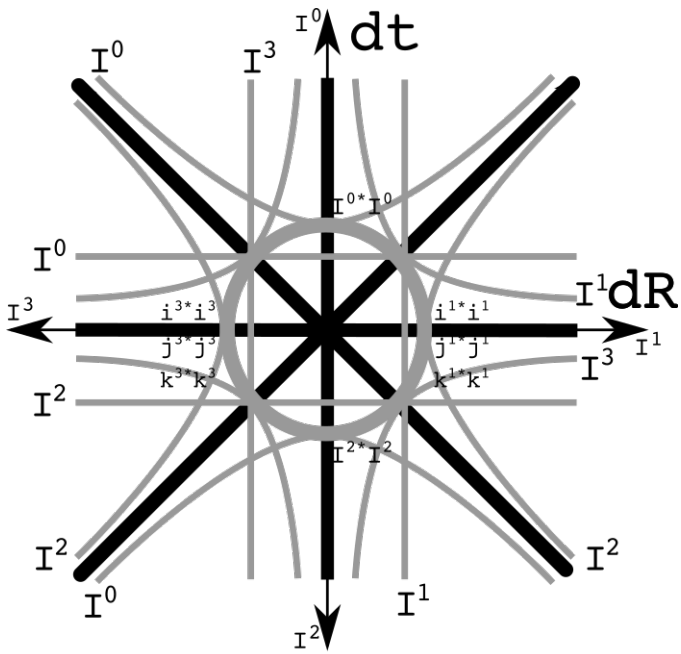
All 0's and 1's
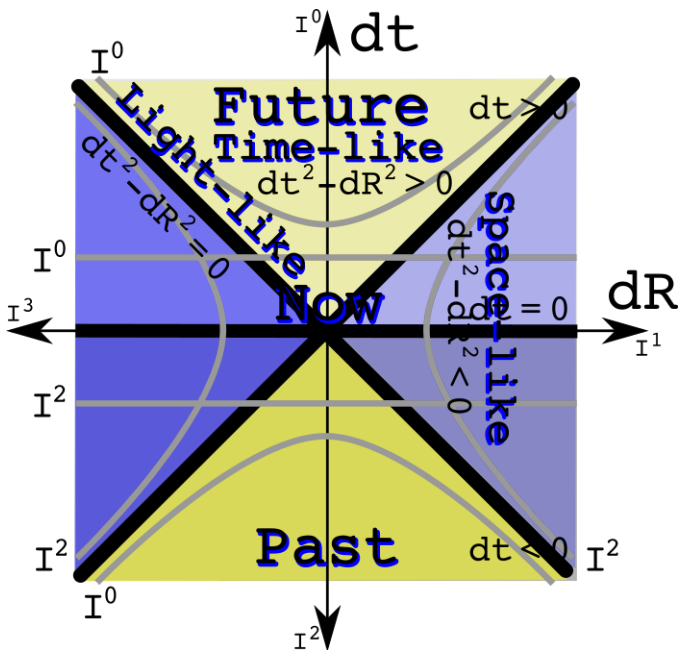
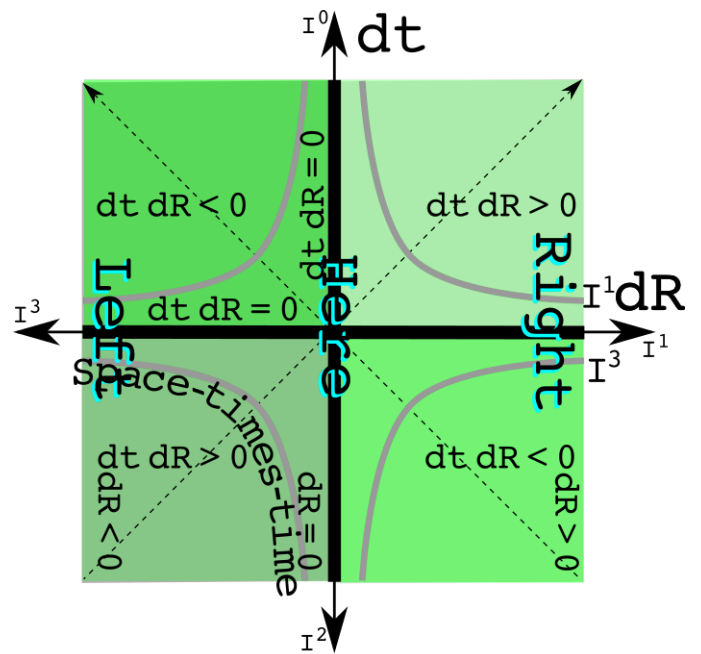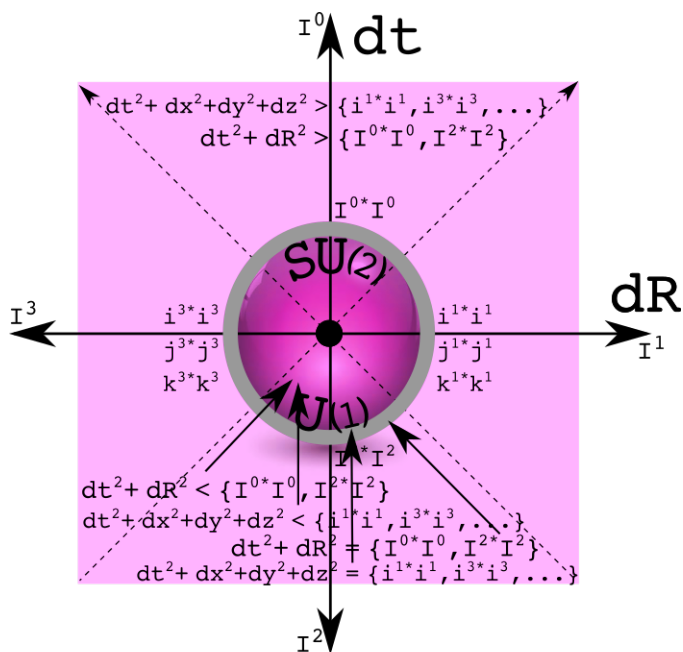**Space + Time dR + dt**

Two-tone Space-like
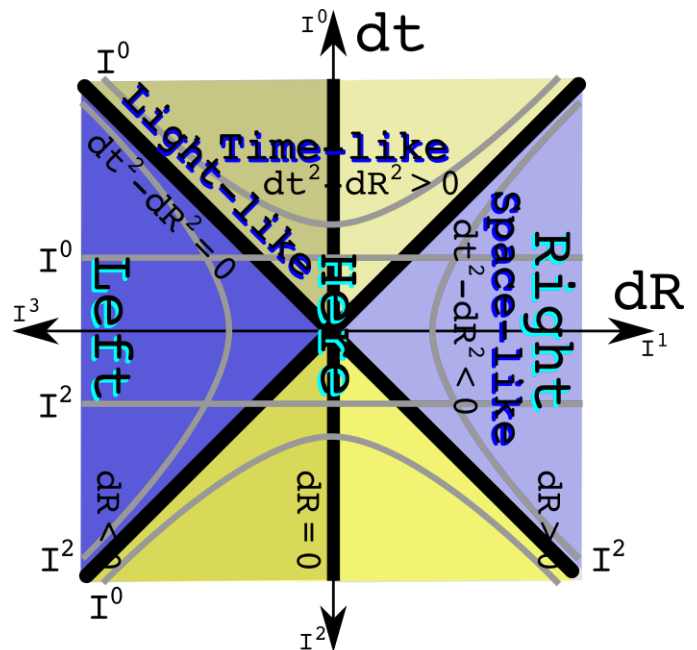
Two-tone Time-like

Overlapping Equivalence Classes
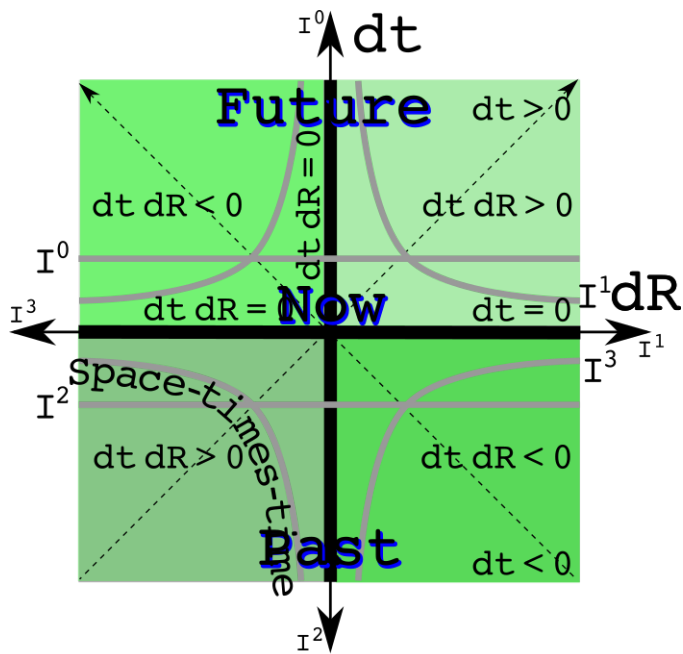
Gravity monotone

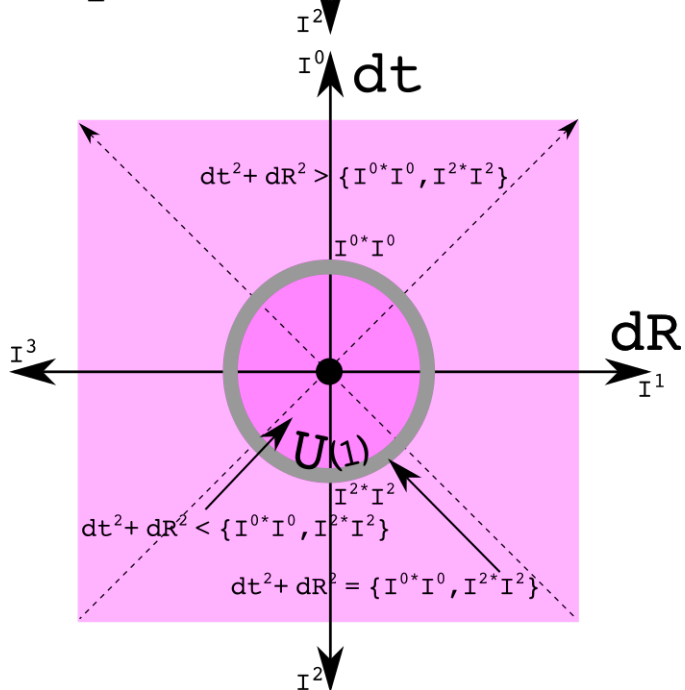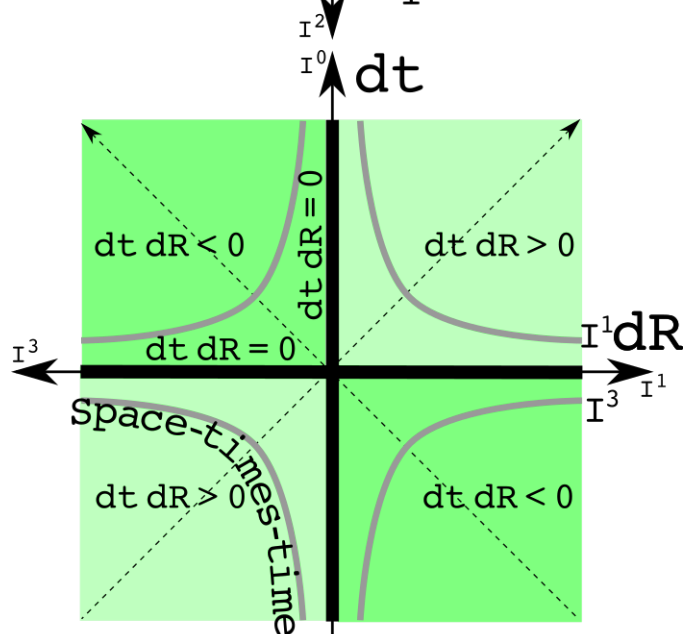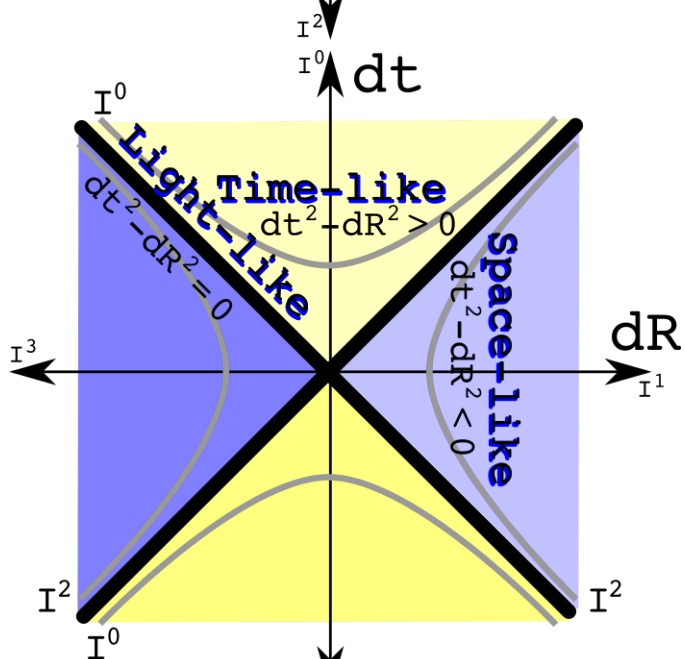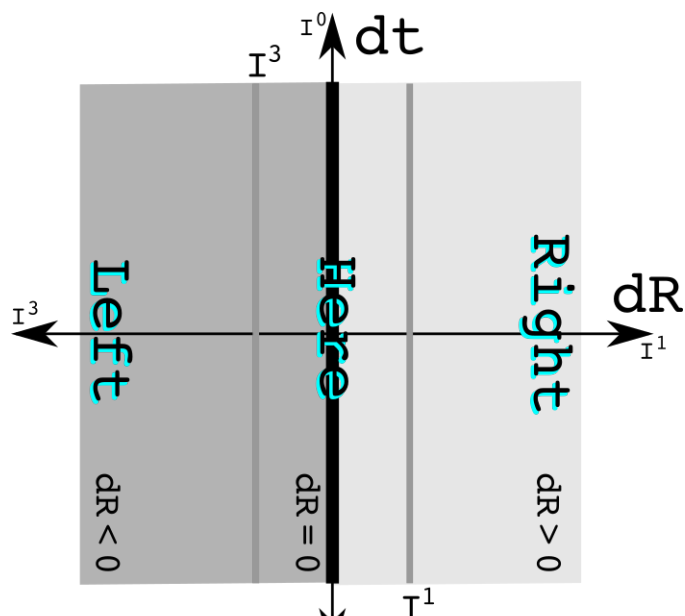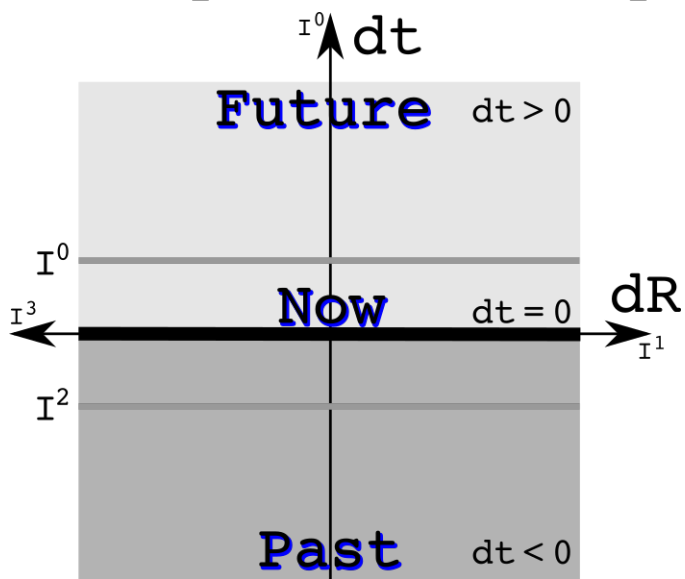**Gravity monotone**

Electro-weak
$$dt^2 + (dx^2 + dy^2 + dz^2)$$

Space-Time Equivalence Classes

Overlapping Equivalence Classes