Relativistic time travel

only forward

\[ a \rightarrow b \rightarrow c, \text{time slows} \]

no possible histories, just one over and over

consistent
i.e., no change
post / future
are fixed

block universe

two types of "time travel"

1. self-consistent \( \Rightarrow \) you were here
   in past, no changes

2. changed history \( \Rightarrow \) free will?
   do-over?
self-consistent

super-deterministic

only one path

no free will

a/g versions

a goes back to t₀, becomes b

time traveler b
has ability to alter events

time traveler b

new timeline, does original still exist "out of time"

in parallel universe?

or is old path "destroyed"
Groundhog travel

At point X return to \( T_0 \)

time trap, loop always the same, but travel makes choices

choices

until correct free choice of history

\( T \) found

do not meet self in past, each path is new

Christmas Carol: time travel (do-over)

\[ T + \text{dies} \quad \frac{T + \text{lives}}{T + \text{dies}} \]

only sees events of future, no travel

each return to to makes new timeline, you do not meet yourself in past
twin histories c twin, no free-will
b twin, choice
(time robot)
a returns, become
b sees a, do all
a's action and
return in time.
b does new actions
returns to become
c, who sees a' of b' until T

travel to past duplicates traveler
as a time robot, who acts out
all event in previous return

tree will only to latest traveler
c unable to alter a or b actions?
multiple history, act of true travel forces new history

history progresses differently
each travel back forces new give

jumps to previous jump point across previous history

hooper history

a returns to to, freezes new path B & a goes back at same point

A remembers replace a’s in B plan

changes @ to wrap into B x A
memory reload history

b has memory of past events, but does not can not act

time protection cause

history protected even knowledge

"already happened"

therefore can not change
Prime history

loops in loop
tามerains interest
takes time to travel to past
only travel back to the median origin

no-generation history

two sets a & b

a no free will
b must do actions to not change past

rules - logical consistency vs conservation laws
b is a, trapped in a's consciousness
aspects to consider

1) conservation laws
2) paradox
groundhog travel

choices

free

Christmas Carol travel (do-over)

T dies

T lives

twin histories

c twin, no free will

b twin, choice

(time robot)
multiple history, act at true travel forces new history

history progresses different

memory reload history

b has memory of past events, but does not act
Prime history

Time machine inverted

Loops in loop
travelers interact
(takes time to travel)
(only travel back to the machine)

No-generation history

Two sets a & b
a no true will
b must do actions to not change past

Rules → logical consistency, no conservation laws
Relativistic time travel

only forward

\( a \)

\( b \) \( \vee c \), time shows

self-consistent

super deterministic

no free will

changed history

do-over travel
Relativistic time travel

only forward

\[ a \]

\[ b \quad v \approx c, \quad \text{time slows} \]

Self-consistent

supra deterministic

no free will

changed history

do-over travel
multiple history, act at true travel forces new history

memory reload history

b has memory of past events, but does not act
prime history

loops in loop
travelers intersect
(takes time to trace)
(only travel back to time machine)

no-generation history

two sets a & b
a no free will
b must do actions to not change past

rules → logical consistency, no conservation laws
groundhog travel

choices

free

Christmas Carol travel (do-over)

+ dies

+ lives

twin histories

c twin, no free will

b twin, choice

(time traveler)