

EINSTEIN'S FIELD EQUATIONS

SPECIAL RELATIVITY

THIS BOOK

"Think globally; measure locally."

Spacetime is globally curved.

Spacetime is locally flat.

GLOBAL METRIC

is in global "map" coordinates, which we choose (almost) arbitrarily.

NO SINGLE OBSERVER MEASURES MAP QUANTITIES

LOCAL METRIC

is in local "frame" coordinates, which we *choose* to be inertial.

EVERY MEASUREMENT IS LOCAL

Principle of Maximal Aging

The worldline of a free stone has maximum wristwatch time between adjacent events. This leads to constants of motion, such as map energy and map angular momentum, which we use to predict global orbits.

TOPICS

NON-SPINNING BLACK HOLE

GRAVITATIONAL MIRAGES

GLOBAL POSITIONING SYSTEM

EXPANDING UNIVERSE

INSIDE THE BLACK HOLE

COSMOLOGY

ORBITING STONE

GRAVITATIONAL WAVES

MERCURY'S PERIHELION ADVANCE

SPINNING BLACK HOLE

ORBITING LIGHT

NAVIGATING THE SPINNING BLACK HOLE

DIVING PANORAMAS

TRAVELING BETWEEN UNIVERSES

WHEELER'S RADICAL CONSERVATISM: Follow what the equations tell us, no matter how strange the results, then develop a new intuition!

THIS BOOK

THIS BOOK

KEY IDEAS: Just three words summarize this book: spacetime, motion, measurement!
The global metric--with arbitrary global coordinates--describes spacetime.
The Principle of Maximal Aging describes free motion.
Choose to report every measurement with respect to a local inertial frame.