



Flat and Curved Space-Times

By George F. R. Ellis, Ruth M. Williams

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This text explains special relativity and the foundations of general relativity theory in terms understandable to undergraduates in mathematics and physics coming to the subject for the first time. Space-time geometry is emphasized throughout, providing a basic understanding of the special relativity effects of time dilation, length contraction, and the relativity of simultaneity. Bondi's k-calculus is introduced as a simple means of calculating the magnitudes of these effects, and this leads to a derivation of the Lorentz Transformation as a way of unifying these results. The invariant interval of flat space-time is compared to that of curved space-times, and the basic properties of simple cosmological models are presented. Appendices enable the advanced student to master the application of four tensors to the relativistic study of energy, momentum and electromagnetism.

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Editorial Review

Review

"One of the best ways to illustrate the concepts arising in special and general relativity is through the use of skillfully drawn space-time diagrams This volume makes elegant use of this technique to present some of the key ideas of relativity physics without assuming a mathematical sophistication beyond high school algebra and trigonometry Would make an excellent text for an elementary course or college seminar."

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"Does an excellent job of making complicated ideas seem simple. . . . It is lavishly illustrated and informally presented. It gives a sound introduction to relativity, black holes and cosmology, and it can teach mathematicians a thing or two." --*New Science*

"This textbook, developed from lectures given by Ellis, presents the special and general theories of relativity for the reader with an introductory college physics, algebra, and trigonometry background.... The book's strength is its reliance on a geometrical view of space-time that conveys concepts without obscuring them in mathematics or words.... an excellent textbook for a college-level introduction to the physics of space-time." --*Science Books and Films*

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About the Author

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