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Sommario/riassunto	In this book, the optimal transportation problem (OT) is described as a variational problem for absolutely continuous stochastic processes with fixed initial and terminal distributions. Also described is Schrödinger's problem, which is originally a variational problem for one-step random walks with fixed initial and terminal distributions. The stochastic optimal transportation problem (SOT) is then introduced as a generalization of the OT, i.e., as a variational problem for semimartingales with fixed initial and terminal distributions. An interpretation of the SOT is also stated as a generalization of Schrödinger's problem. After the brief introduction above, the fundamental results on the SOT are described: duality theorem, a

sufficient condition for the problem to be finite, forward–backward stochastic differential equations (SDE) for the minimizer, and so on. The recent development of the superposition principle plays a crucial role in the SOT. A systematic method is introducedto consider two problems: one with fixed initial and terminal distributions and one with fixed marginal distributions for all times. By the zero-noise limit of the SOT, the probabilistic proofs to Monge's problem with a quadratic cost and the duality theorem for the OT are described. Also described are the Lipschitz continuity and the semiconcavity of Schrödinger's problem in marginal distributions and random variables with given marginals, respectively. As well, there is an explanation of the regularity result for the solution to Schrödinger's functional equation when the space of Borel probability measures is endowed with a strong or a weak topology, and it is shown that Schrödinger's problem can be considered a class of mean field games. The construction of stochastic processes with given marginals, called the marginal problem for stochastic processes, is discussed as an application of the SOT and the OT.