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Lagrangian analysis and quantum mechanics, a mathematical structure related to asymptotic expansions and the Maslov index, by Jean Leray, the MIT Press, Cambridge, Mass., 1982, xvii + 271 pp., $35.00. ISBN 0-2621-2087-9

Semi-classical approximation in quantum mechanics, by V. P. Maslov and M. V. Fedoriuk, Mathematical Physics and Applied Mathematics, vol. 7, D. Reidel Publishing Company, Dordrecht:Holland/Boston:U.S.A./London:England, 1981, ix + 294 pp., Cloth Dfl. 125.00/U.S. $66.00. ISBN 9-0277-1219-0

1. It is a fundamental principle in quantum mechanics that, when the time and distance scales in a system are large enough relative to Planck's constant h, the system will approximately obey the laws of classical, Newtonian mechanics. To confound the uninitiated who think that physical constants are immutable this is usually rephrased: in the limit $h \to 0$ quantum mechanics tends to Newtonian mechanics. In either form this principle says very little. Quantum mechanics would not be widely accepted if it did not predict that boulders and freight trains obey Newton's laws. Quasi-classical approximations express this limiting behavior in more useful ways, through formulas for expectations, energy levels, etc. which are asymptotic to the exact formulas as $h \to 0$. The paradigm of such a formula is Bohr's energy quantization law. Bohr actually deduced this *before* the "exact" formula was introduced by Schrödinger. Nonetheless, Bohr's law can be rederived and generalized as a quasi-classical approximation. Quasi-classical approximations for problems with more than one degree of freedom are rather new. The first book to deal with them in some generality was Maslov's remarkable monograph [**8**]. In his preface to the French translation of [**8**] Jean Leray noted that a mathematician reading it would read much more between the lines than on them. *Quasi-classical approximations in quantum mechanics* (= QAQM) and *Lagrangian analysis and quantum mechanics* (= LAQM) are not so much sequels to [**8**] as systematic efforts to fill in those missing lines. (In this review we use the exact English translation of the Russian title of the book of Maslov and Fedoriuk. "Quasi-classical" and "semi-classical" appear to be used equally often in the English literature.)