Quantum-Classical Correspondence through the Momentum Function M.K. BALASUBRAMANYA[1], AAPT — Quantum Hamilton-Jacobi theory formulated in terms of the quantum characteristic function leads to the definition of the quantum momentum function. As in classical mechanics where the dynamical equations lead to trajectories in phase space quantum mechanics points to paths in complex phase space for stationary states. The relation between the coordinate and the momentum displays a rich structure with the momentum function riddled with poles each of which has a residue proportional to Planck's constant. For high excitations the quantum momentum function transitions to the classical momentum function leading to the orbit equation in phase space. The mechanism of this transition will be illustrated for a few analytic potentials.

[1]Department of Science and Mathematics, Texas AM University-San Antonio

Mirley Balasubramanya
AAPT