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Liouvillian Quasinormal Modes of Black Holes

The ordinary differential equations governing the radial parts of the perturbations of Kerr–Newman black holes admit Liouvillian (closed-form) solutions for a discrete set of explicit frequencies. For configurations of the black hole charge and angular momentum in which the angular parts of the perturbations approach the spherical harmonics we find Liouvillian solutions satisfying the boundary conditions for quasinormal modes.