A novel perturbation theory has been developed to account for nonadiabatic effects in diatomic molecules. All molecular levels can be obtained simultaneously from a single nuclear equation corrected for the presence of \((m/M)^2\) terms. Comparison with the direct nonadiabatic calculations for rotationless states of H\(_2\) demonstrates an agreement at the level of \(10^{-5}\) cm\(^{-1}\) for the ground tone transition.