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On the equivalence of Flavor SU(3) analyses of B to PP decays

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We conduct an SU(3) analysis of $B \to PP$ decays based on reduced matrix elements (RMEs), with P being a light pseudoscalar meson excluding $\eta^{(\prime)}$. We show that a complete basis for the $B \to PP$ decays consists of ten RMEs, where the three RMEs arise from the electroweak penguin operators $O_{7,8}$. In the Standard Model, the relevant Wilson coefficients are small and thus can be neglected. We further demonstrate the equivalence of the RME approach with the irreducible representation amplitude (IRA) and topological diagram amplitude (TDA) methods, and derive relations between the ten RME amplitudes and corresponding IRA/TDA amplitudes. These relations lay a foundation for consistent SU(3) analyses of heavy meson decays.

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