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## Masses, mixings and degeneracy of a neutral Higgs mixture H-A

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### Abstract content

### Summary

In this work, we analyze the masses and mixings of an isolated doublet of neutral, heavy Higgs bosons in the Minimal Supersymmetric Standard Model with CP violation. We show that there is a set of Lagrangian parameter values for which the isolated doublet of mass eigenstates is degenerated. At the degeneracy the physical masses as functions of the Lagrangian parameters have a rank one algebraic branch point, and the real and imaginary parts have branch cuts that start at the same exceptional point, but extend in opposite directions in parameter space. Associated with this singularity, the propagator of the mixing H-A neutral Higgs system has a double pole on the non-physical sheet of the complex energy squared plane  $s$ . We also examine, in detail, the continuity of the transition amplitude at the point of exact degeneracy of the two masses.

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