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A Duality Relation between Loops and Trees at Two Loops and Beyond

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I present an extension of the duality relation between one-loop integrals and phase-space integrals, developed by S. Catani et al., to higher-order loops. This duality relation is realized by a modification of the customary +i0 prescription of the Feynman propagators and compensates for the absence of multiple-cut contributions that appear in the Feynman tree theorem. I will report on a rederivation of the duality theorem at one-loop order in a form which is more suitable for its iterative extension to higher loop orders and show explicitly its application to the two- and three-loop scalar master integrals, for which the structure of the occurring cuts and results are discussed in detail.

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