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Self inductance of a wire loop as a curve integral

R. Dengler

It is shown that the self inductance of a wire loop may be written as a curve integral akin to the Neumann formula for the mutual inductance of two wire loops. The only difference is that contributions where the two integration variables get too close to each other must be excluded from the curve integral and evaluated in detail. The contributions of these excluded segments depend on the distribution of the current in the cross section of the wire. They add to a simple constant proportional to the wire length. The error of the new expression is of first order in the wire radius if there are sharp corners and of second order in the wire radius for smooth wire loops.

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