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# Equivalence between two finite element methods for the eddy current problem*

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**Abstract**

The goal of this talk is to prove that two, in principle different, well-known finite element approximations of the eddy current model are equivalent. The first one concerns a formulation involving the magnetic field in the conductor and the magnetic scalar potential in the dielectric ([2]). The second one solves another formulation of the same problem involving the magnetic field in both, the conductor and the dielectric, and a Lagrange multiplier in the dielectric ([1]). The latter is also shown to be equivalent to a third formulation involving two Lagrange multipliers (also introduced in [1], based on results from [3]), which leads to a well posed linear system.

**Key words**: Time-harmonic eddy current problems, finite element approximation.

## References

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