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Leads as Self-Energies in Nonequilibrium Spin Transport
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Open quantum systems consist of semi-infinite leads which transport electronic spin or charge to and from a device. We show here that within the nonequilibrium Green's function technique for continuum systems, the leads can be replaced by simple c-number self-energies. Our approach is a reformulation of a continuum calculation developed by T.E. Feuchtwang and connects this method with calculations on a lattice. While the choice of internal boundary conditions gives a limited variability to the self-energies, a particular choice greatly simplifies calculations in two and three dimensions. We close with an example from spin transport.

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