

I Dynamical Mean-Field Theory

Source: `georgesDynamicalMeanfieldTheory1996` - `georgesDynamicalMeanfieldTheory1996` [geo

Most general non-interacting electronic Hamiltonian in second quantization:

$$H_0 = \sum_{i,j,\sigma} \quad (\text{I.1})$$

with lattice coordinates i, j and spin σ .

One particle Green's function (many-body object, coming from the Hubbard model):

$$G(\mathbf{k}, i\omega_n) = \frac{1}{i\omega_n + \mu - \epsilon_{\mathbf{k}} - \Sigma(\mathbf{k}, i\omega_n)} \quad (\text{I.2})$$

with the self energy $\Sigma(i\omega_n)$ coming from the solution of the effect on-site problem:

The Dyson equation

$$G(\mathbf{k}, i\omega_n) = (G_0(\mathbf{k}, i\omega_n) - \Sigma(\mathbf{k}, i\omega_n))^{-1} \quad (\text{I.3})$$

relates the non-interacting Greens function $G_0(\mathbf{k}, i\omega_n)$ and the fully-interacting Greens function $G(\mathbf{k}, i\omega_n)$ (inversion of a matrix!).