**Many Body Perturbation Theory**

**Time-Independent PT**

Make brief statement again. The perturbation theories we used to determine energies and their eigenstates …



As do the BWPT formulas:



And especially the variational principle, which is used quite a bit … can still be used here. We just have to make sure we use symmetrized many-body states. And likewise the basis of TDPT also holds:

**Time-Dependent PT**

Everything is the same here as well. There is no need to update formulas – the main one being simply:



which breaks down into the following for the wavefunction:



And the following for the operator:



But the constant need for symmetrization makes the HS formalism we’ve developed so far inconvenient to use. So we’ll move on to a truncation of the HS, called Fock space. Although all of the techniques developed so far will apply equally well in this new space, it tends to lend itself better to a Green’s function formalism for calculating energies, and time-development in general.