**Many Body Perturbation Theory**

**Time-Independent PT**

I’ll briefly make a statement about time-independent perturbation, which we had used to ascerrtain the eigenvalues/eigenstates of the single particle system. There isn’t much to add here. The RSPT formulas apply equally well to a single particle HS as to a many-particle HS:



As do the BWPT formulas:



And especially the variational principle, which is used quite a bit.

**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:

