Physics 556 Spring 2004

D&S notation	**Phy556 notation**
electron Green's function $G(\vec{k}\sigma) = \langle T c_{\vec{k}}(\sigma) c^\dagger_{\vec{k}}(0)\rangle$ $G(\vec{k}\sigma) = \sum_{\bar{\nu}} e^{i\bar{\nu}\sigma} G(\vec{k}\bar{\nu})$ $\bar{\nu} = \frac{2\pi}{\beta}(\nu + \frac{1}{2})$ (ν = integer)	 $G(\vec{k}\sigma) = -\langle T c_{\vec{k}}(\sigma) c^\dagger_{\vec{k}}(0)\rangle$ $G(\vec{k}\sigma) = \frac{1}{\beta}\sum_{\bar{\nu}} e^{-i\bar{\nu}\sigma} G(\vec{k}\bar{\nu})$ $\bar{\nu} = \frac{2\pi}{\beta}(\nu + \frac{1}{2})$ (ν = integer)
non-interacting electron Green's function $G_0(\vec{k}\bar{\nu}) = \frac{1}{\beta}\frac{1}{i\bar{\nu}+\epsilon_{\vec{k}}}$	 $G_0(\vec{k}\bar{\nu}) = \frac{1}{i\bar{\nu}-\epsilon_{\vec{k}}}$
interacting electron Green's function $-\beta\Sigma(\vec{k}\bar{\nu})$ = sum of all self-energy graphs $G(\vec{k}\bar{\nu}) = \frac{1}{\beta}\frac{1}{i\bar{\nu}+\epsilon_{\vec{k}}+\Sigma(\vec{k}\bar{\nu})}$	 $\Sigma(\vec{k}\bar{\nu})$ = sum of all self-energy graphs $G(\vec{k}\bar{\nu}) = \frac{1}{i\bar{\nu}-\epsilon_{\vec{k}}-\Sigma(\vec{k}\bar{\nu})}$
phonon Green's function $G(\vec{Q}\sigma) = \langle T u_{\vec{Q}}(\sigma) u_{-\vec{Q}}(0)\rangle$ $G(\vec{Q}\sigma) = \sum_{\bar{\lambda}} e^{i\bar{\lambda}\sigma} G(\vec{Q}\bar{\lambda})$ $\bar{\lambda} = \frac{2\pi}{\beta}\lambda$ (λ = integer)	 $D(\vec{Q}\sigma) = -\langle T u_{\vec{Q}}(\sigma) u_{-\vec{Q}}(0)\rangle$ $D(\vec{Q}\sigma) = \frac{1}{\beta}\sum_{\bar{\lambda}} e^{-i\bar{\lambda}\sigma} D(\vec{Q}\bar{\lambda})$ $\bar{\lambda} = \frac{2\pi}{\beta}\lambda$ (λ = integer)
non-interacting phonon Green's function $G_0(\vec{Q}\bar{\lambda}) = \frac{\hbar}{\beta M}\frac{1}{\bar{\lambda}^2+\Omega^2_{\vec{Q}}}$	 $D_0(\vec{Q}\bar{\lambda}) = \frac{\hbar}{M}\frac{1}{(i\bar{\lambda})^2-\Omega^2_{\vec{Q}}}$
To get retarded correlation functions at real frequencies replace $i\bar{\nu}$ or $i\bar{\lambda}$ by $-\omega - i\delta$	 replace $i\bar{\nu}$ or $i\bar{\lambda}$ by $\omega + i\delta$