- Keldysh basis relations:

$$
\begin{aligned}
&c^{(1)} = \frac{1}{\sqrt{2}}\left(c^{+} + c^{-}\right),\ c^{(2)} = \frac{1}{\sqrt{2}}\left(c^{+} - c^{-}\right),\\
&c^{\pm} = \frac{1}{\sqrt{2}}\left(c^{(1)} \pm c^{(2)}\right);\\
&G^{R} \equiv G^{12} = \frac{1}{2}\left(G^{++} - G^{--} - G^{+-} + G^{-+}\right),\\
&G^{A} \equiv G^{21} = \frac{1}{2}\left(G^{++} - G^{--} + G^{+-} - G^{-+}\right),\\
&G^{K} \equiv G^{11} = \frac{1}{2}\left(G^{++} + G^{--} + G^{+-} + G^{-+}\right),\\
&G^{\pm\pm} = \frac{1}{2}\left[G^{K} \pm (G^{R} + G^{A})\right],\ G^{\pm\mp} = \frac{1}{2}\left[G^{K} \mp (G^{R} - G^{A})\right];
\end{aligned} \tag{46}
$$

- Self-energy (and inverse Green's functions):

$$
\begin{aligned}
&\Sigma^{R} \equiv \Sigma^{21} = \frac{1}{2}\left(\Sigma^{++} - \Sigma^{--} + \Sigma^{+-} - \Sigma^{-+}\right),\\
&\Sigma^{A} \equiv \Sigma^{12} = \frac{1}{2}\left(\Sigma^{++} - \Sigma^{--} - \Sigma^{+-} + \Sigma^{-+}\right),\\
&\Sigma^{K} \equiv \Sigma^{22} = \frac{1}{2}\left(\Sigma^{++} + \Sigma^{--} - \Sigma^{+-} - \Sigma^{-+}\right);\\
&\Sigma^{\pm\pm} = \frac{1}{2}\left[\Sigma^{K} \pm (\Sigma^{R} + \Sigma^{A})\right],\ \Sigma^{\pm\mp} = -\frac{1}{2}\left[\Sigma^{K} \mp (\Sigma^{R} - \Sigma^{A})\right];
\end{aligned} \tag{47}
$$

- Fluctuation-dissipation theorem (FDT)

$$
G^{K} = 2i\tanh\left(\frac{\beta(\omega-\mu)}{2}\right)\operatorname{Im} G^{R} \tag{48}
$$

- Orbital and bonding-antibonding basis:

$$
c_{\pm} = \left(c_1 \pm c_2\right)/\sqrt{2} \tag{49}
$$

- Symmetries of the Green's functions

$$
\begin{aligned}
G^{A}(\tau) &= \quad G^{R}(-\tau)^{*} \implies G^{A}(\omega) = \quad G^{R}(\omega)^{*},\\
G^{K}(\tau) &= -G^{K}(-\tau)^{*} \implies G^{K}(\omega) = -G^{K}(\omega)^{*} \implies Re(G^{K}) = 0
\end{aligned} \tag{50}
$$