$$
\begin{aligned}
&\approx -\frac{L}{2\pi} e^{ik_{0z}r_{ij}} \frac{\omega_0 \mu^2}{\epsilon_0 L S \hbar} 2\pi \frac{\omega_0}{c^2 k_{0z}} \cosh^2 r S_i^+ S_j^- \rho^S(t) \\
&\approx -[\frac{\gamma_{1d}}{2} \cos(k_{0z} r_{ij}) + i \frac{\gamma_{1d}}{2} sin(k_{0z} r_{ij})] \cosh^2 r S_i^+ S_j^- \rho^S(t) \qquad (1) \\
&\equiv -(\frac{\gamma_{ij}}{2} + i\Lambda_{ij}) \cosh^2 r S_i^+ S_j^- \rho^S(t)
\end{aligned}
$$