$$
\begin{aligned}
H &= \frac{\omega_0}{2}\sigma^z + \sum_j \left[\nu_j b_j^\dagger b_j + \frac{\xi_j}{2}\left(b_j^\dagger + b_j\right)\sigma^z\right] \\
A(\omega-\omega_0) &= \frac{g^2 N}{2}\mathrm{Re}\int_0^\infty dt e^{i(\omega-\omega_0)t}\langle\sigma^-(t)\sigma^+(0)\rangle e^{-(\Gamma_\uparrow+\Gamma_\downarrow)t/2} \\
&= \frac{g^2 N}{2}\mathrm{Re}\int_0^\infty dt e^{i(\omega-\omega_0)t} e^{-(\Gamma_\uparrow+\Gamma_\downarrow)t/2} e^{-C(t)} \\
C(t) &= \int \frac{J(\nu)}{\nu^2}\left[\coth\left(\frac{\beta\nu}{2}\right)(1-\cos\nu t) + i\sin\nu t\right] \\
J(\nu) &= \sum_n \xi_n^2 \delta(\nu-\nu_n) \\
&= 2a\nu^s \nu_c^{1-s} e^{-(\nu/\nu_c)^2}
\end{aligned}
$$