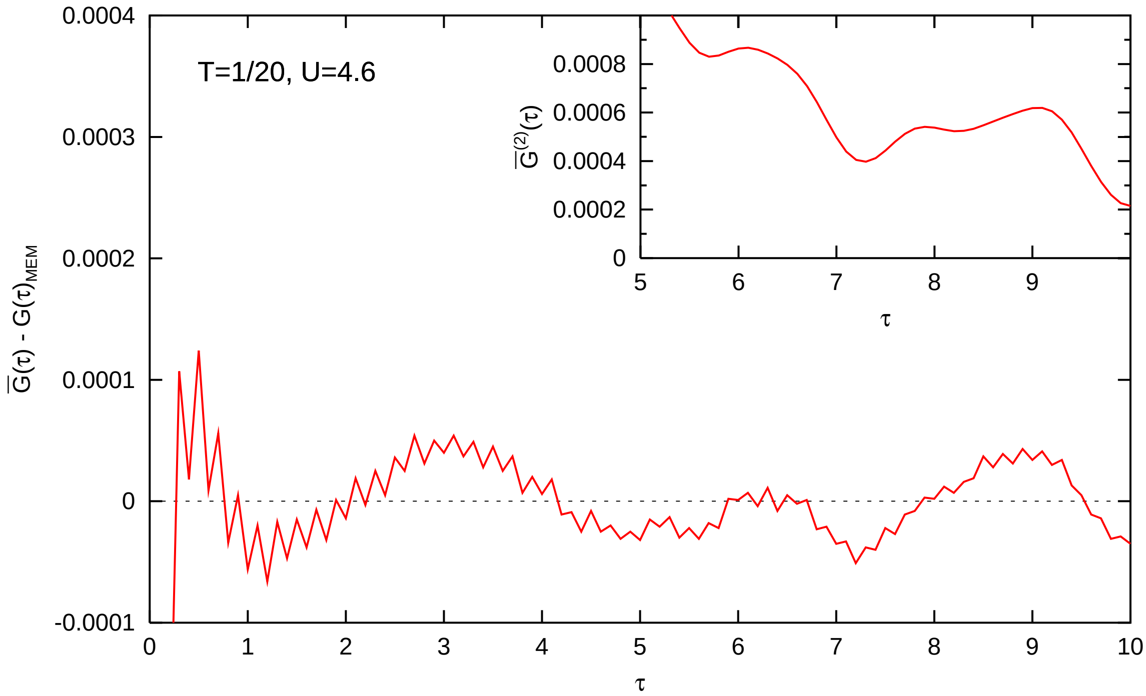

Figure 3.74: Difference between imaginary-time Green function $\bar{G}(\tau)$ estimated by QMC and $G(\tau)$ corresponding to the MEM spectrum obtained using Sandvik's scheme and a narrow default model (solid line in Fig. 3.72). Inset: second derivative $\mathrm{d}^2\bar{G}(\tau)/\mathrm{d}\tau^2$, smoothed with Gaussian of width 0.3.

3.8.3 Numerical Results for the Bethe DOS

In this subsection, we present numerical results for the local spectral function of the half-filled Hubbard model with semi-elliptic DOS at moderately low temperatures ($T = 0.05$ and $T = 0.067$). These results are based on the MEM procedure discussed above (using Sandvik's scheme with properly adjusted errors) and on the QMC estimates of the imaginary-time Green function shown in Fig. 3.75 for $T = 0.05$ and in Fig. 3.76 for $T = 0.067$. Using the symmetry $G(\beta - \tau) = G(\tau)$, both figures are split for easier comparison of metallic solutions (left panel, only shown for $\tau \leq \beta/2$) and insulating solutions (right panel, only shown for $\tau \geq \beta/2$). Furthermore, the noninteracting Green function ($U = 0.0$) is included for reference.

The spectra for the metallic phase at $T = 0.05$, i.e., slightly below the critical temperature $T^* \approx 0.055$, are shown in Fig. 3.77 and Fig. 3.78 as obtained from MEM using a flat and a narrow default model, respectively. The corresponding results for the insulating phase are depicted in Fig. 3.79 and Fig. 3.80. Evidently, the dependence of the spectra on the default model is negligible for all interactions U presented in the graphs. In the metallic phase, the spectral density at the Fermi level ($\omega = 0$) is approximately pinned at the noninteracting value $\rho(0) = 1/\pi \approx 0.32$ for $U \lesssim 4.4$. Since Luttinger's theorem is exact only at $T = 0$, the slight deviation in this Fermi liquid regime can be attributed to the finite temperature. The larger deviation for