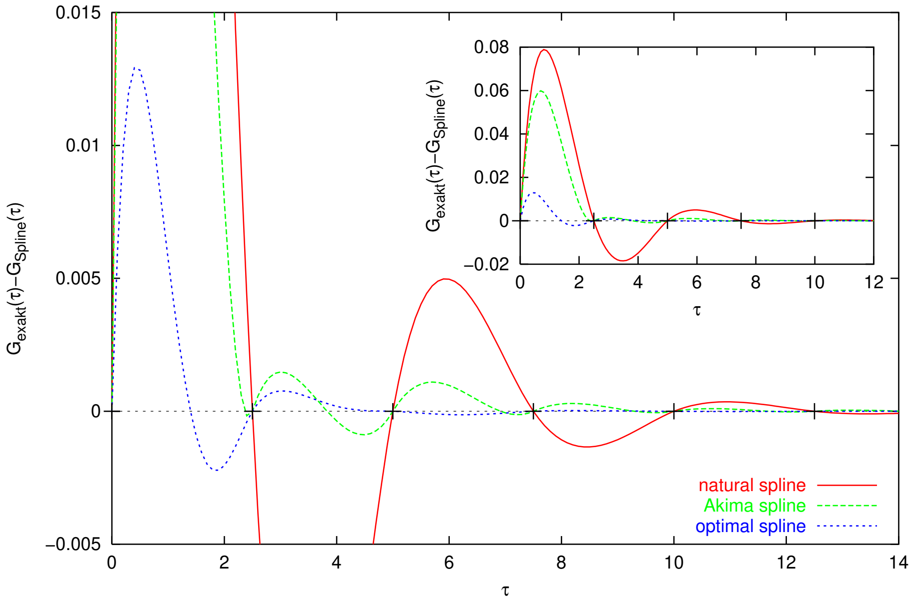

Figure C.1: Difference between exact noninteracting Green function (for semi-elliptic DOS and $\beta = 100$) and cubic spline approximations to the discretized function for $\Lambda = 40$. The strong oscillations observed for the natural spline and for the Akima spline are due to the unphysically vanishing second derivatives (at $\tau = 0$) of these splines. An optimal choice of the boundary condition reduces the discrepancies by an order of magnitude and doubles the oscillation frequency. The inset shows the full curves for small τ.

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for this fit. The discrepancies can be reduced by about an order of magnitude and a smooth curve can be obtained by choosing an appropriate boundary condition (short-dashed line) which has here been obtained by minimizing the function

$$F(G^{(2)}(0)) = \sum_{j=1}^{L-1} \left(\frac{G^{(2)}((j+1)\Delta\tau)}{G((j+1)\Delta\tau)^2} - \frac{G^{(2)}(j\Delta\tau)}{G(j\Delta\tau)^2} \right)^2 . \tag{C.1}$$

It is possible to avoid the minimization by computing the correct second derivative $G^{(2)}(0)$ analytically (for arbitrary interaction); in any case, however, a cubic spline interpolation of the full Green function suffers from the problem that derivatives of fourth and higher order vanish on segments of the splines while they are large for the true Green function, in particular at $\tau = 0$.

Consequently, a further significant reduction of errors can be expected when the spline approximation is applied to the difference between the measured (discretized) Green function $\{\bar{G}_l\}$ and a good estimate for G when the Fourier transform is known exactly for the latter. Such a scheme can be based on the following exact high-frequency expansion for the self-energy (Potthoff et al., 1997):

$$\Sigma_\sigma(\omega) = U\,(\langle \hat{n}_{-\sigma}\rangle - \frac{1}{2}) + U^2\,\frac{\langle \hat{n}_{-\sigma}\rangle(1-\langle \hat{n}_{-\sigma}\rangle)}{\omega} + \mathcal{O}(\omega^{-2}). \tag{C.2}$$

One possible choice of a model self-energy with this asymptotic behavior (including