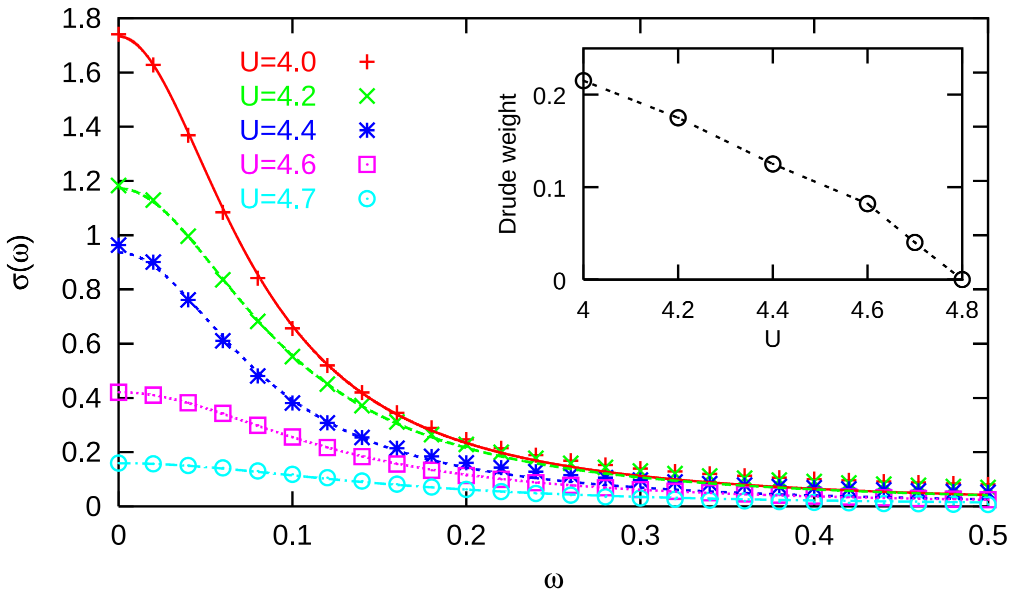

Figure 4.35: Drude part of the optical conductivity $\sigma(\omega)$ for the isotropic "redefined Bethe lattice" at $T = 0.05$ in the metallic phase. The numerical results (symbols) are fitted with Lorentzian curves (lines); their normalization, the Drude weight, decreases rapidly with increasing U as seen in the inset, while their width increases only slightly.

---

the quasiparticle peaks (of the local spectra, cf. Fig. 3.77 and Fig. 3.79). Incoherent absorption bands, roughly in the range above $\omega \gtrsim 1$ can be subdivided into mid-infrared contributions at $1 \lesssim \omega \lesssim 3$ which are associated with excitations from the lower Hubbard band to the quasiparticle peak or from the quasiparticle peak to the upper Hubbard band while a contribution at $\omega \approx U$ is associated with excitations from the lower to the upper Hubbard band. Depending on the interaction strength U, this subdivision appears in the form of shoulders or genuine peaks. The inset of Fig. 4.34 shows the partial optical f-sum which allows for a direct comparison of the weights associated with the different contributions. Note the analogy of this representation to the experimental curves displayed in Fig. 4.3. As expected, both the contribution of the Drude peak and the total f-sum decrease for increasing U. Figure 4.35 concentrates on the coherent peaks seen at low frequencies. Here, the numerical results are indicated by symbols, while the lines represent Lorentzian fits. The good quality of the fits allows for a determination of the weight and the width of each Drude peak. The drude weights are shown as a function of U in the inset of Fig. 4.35; its initially linear decay with increasing U becomes more rapid near the MIT. Here, lines are guides to the eye only. The width of the Drude peak (not shown) is nearly constant (about 0.08) for $U \leq 4.4$ and increases to 0.16 for $U = 4.7$. Figure 4.36 shows $\sigma(\omega)$ and its f-sum for the insulating phase using the same scales as in Fig. 4.34. Just above the MIT, i.e., for $U = 4.8$, the conductivity spectrum is very broad with long tails both for small and large frequencies. Further away from the transition, weight shifts towards the central region, i.e., the width of the absorption