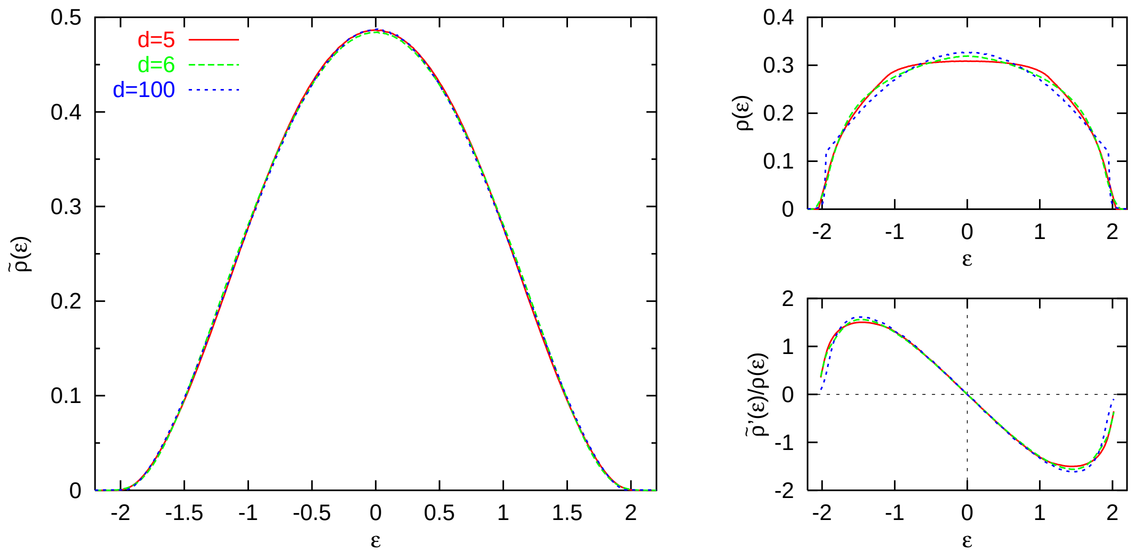


**Figure 4.16:** DMFT transport characteristics of hc lattice with $5^{\text{th}}$ NN hopping (analogous to Fig. 4.14). $\tilde{\rho}(\epsilon)$ is practically independent of dimension.

leads to similar expressions for $\sigma(\omega)$ and would, thus, also lead to similar results. In this sense, the final numerical results which we will present in Sec. 4.6 are not specific to the limit $d = \infty$, but apply at least qualitatively also for a local theory of conductivity in finite $d$, as long as the noninteracting DOS is symmetric and roughly semi-elliptic.

## 4.5 Generalizations

In the previous section, we have focused on the question of how to define and compute $\sigma(\omega)$ in a way consistent with DMFT calculations for a semi-elliptic noninteracting DOS and within the paramagnetic phase. Before showing numerical results based on these studies in the next subsection, we use this section to present generalizing concepts. In subsection 4.5.1, we discuss various cases of stacked lattices which lead to various degrees of coherence in the transport along the stacking direction. Properties entering a local theory of $\sigma(\omega)$ in finite dimensions are collected for various lattice types in subsection 4.5.2. Finally, the effect of frustration on transport is studied analytically using the $t - t'$ lattice, i.e., a hc lattice with NN and NNN hopping in subsection 4.5.3.

### 4.5.1 Coherent versus Incoherent Transport in High Dimensions

As discussed in subsection 4.4.4, diagrammatic contributions to the optical conductivity along a symmetry direction generically only involve two neighboring hyperplanes.