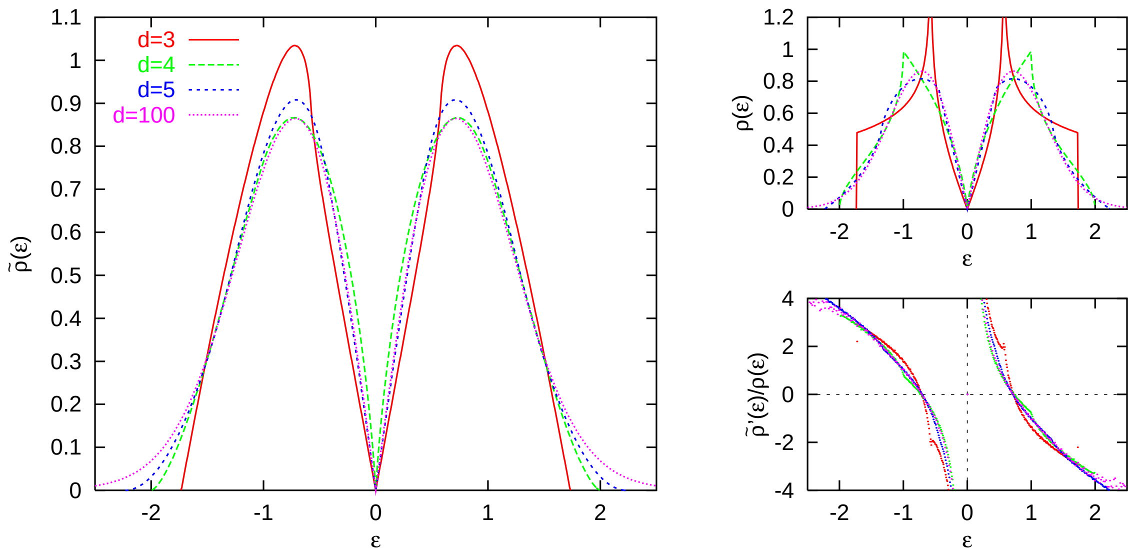

Figure 4.23: DMFT transport characteristics of the hyperdiamond lattice.

$\tilde{\rho}'(\epsilon)/\rho(\epsilon)$ acquires a nontrivial shape the limiting form of which will be derived in the next subsection. Again, the deviations of $\tilde{\rho}(\epsilon)$ and of $\tilde{\rho}'(\epsilon)/\rho(\epsilon)$ in finite dimensions from the asymptotic form (for $d \to \infty$) are seen to be small. This fact is further illustrated for $\tilde{\rho}(\epsilon)$ in Fig. 4.22 a and Fig. 4.22 b, where the d-dimensional results have been divided by the asymptotic results, for the hc lattice with only NN hopping and for the t-t' lattice with $a^* = -0.25$, respectively.

As a final example, Fig. 4.23 shows results for the hyperdiamond lattice which is a semimetal at half filling (cf. App. B). At the pseudogap, the function $\tilde{\rho}'(\epsilon)/\rho(\epsilon)$ entering the f-sum rule is not even continuous.

4.5.3 Impact of Frustration by $t - t'$ Hopping

Throughout large parts of this thesis we have studied models with a symmetric DOS. While this is a convenient special case it is certainly not generic. As discussed in subsection 2.1.3, true magnetic frustration which is an essential microscopic ingredient for models with nontrivial low-temperature phases is generically associated with an asymmetry of the DOS. Furthermore, for extensions of the hc lattice, it is associated with even-range hopping (rather than only odd-range hopping). Thus, at least in finite dimensions, the hc lattice with nearest neighbor (NN) and next-nearest neighbor (NNN) hopping is the prototype lattice for studying magnetic frustration.

Our interest for performing actual calculations was triggered by a recent DMFT paper on the impact of frustration on the optical conductivity, on the dc Hall Resistance, and on the thermopower of correlated electron systems (Merino and McKenzie, 2000). In this work, the expressions valid for the transport properties of the hc lattice were used also in the case of finite frustration $a^* = 0.1$ and $a^* = 0.3$.[45] We

[45] In the publication, the authors explicitly point out that this simplification is used “in order