Particle Model of the Scattering-Induced Wigner Function Correction

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The recent interest in the semiconductor device society to simulation methods which rely on the Wigner transport picture is due to the ability of the latter to account for quantum-coherent and phase-breaking processes of de-coherence due to scattering of the current carriers with phonons and other crystal lattice imperfections. In this picture the scattering can be accounted for in a straightforward way by using the Boltzmann collision models, the coherent counterpart, however, results in a heavy numerical burden. On the contrary the Green's function is numerically efficient in the cases of coherent transport.
We propose and approach which combines the advantages of the two methods: Green's function calculations of the of coherent transport determined by the boundary conditions in the semiconductor device provide the coherent Wigner function f_w^c. It is used in an equation for the correction Δf_w to f_w^c, obtained by a subtracting the coherent Wigner equation from the general coherent/de-coherent counterpart. Thereby, the boundary value problem is replaced by an evolution problem where the initial condition is determined by f_w^c. There are several alternatives to approach this equation. Depending on the physical conditions the exact solution may be required, or it may be approximated to a classical transport equation, or the initial condition may already be considered a sufficient correction accounting for the de-coherence effects.
A necessary step in all cases is the explicit evaluation of the initial condition which involves multidimensional integrals of the Boltzmann scattering operator acting on f_w^c. We present a particle approach which has been derived for this purpose using numerical Monte Carlo theory.

Dictionary Compression and Information Source Correction

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Nowadays, with the spread of computer aided products native human language support is becoming an essential part of many systems. Word level spell checking is the first input filter applied on entered text. All spell checking tools require some kind of word dictionary to achieve this functionality. These dictionaries can usually be sorted into two groups, with the exceptions of some exotic languages.
The first group consists of the isolating languages in which the number of derived words (greener) is of the same order than the number of stems (green). These languages are usually can be easily represented by a list, because the amount of information is not much. The second group consists of the non-isolating languages in which there can be 10^4 derived words of one single stem. These languages are represented by algorithms, which are generated from grammatical rules.