New aspects of variable range hopping in doped polyaniline

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<u>Abstract:</u> Temperature (T) dependence of the electrical conductivity σ of the own-made polyanilne pellets, highly doped either by HCl or by dodecyl benzene sulphonic acid, is measured and discussed. For both dopants, the variable-range-hopping exponent equal to 2/5 is found below T*~ 200-250 K. This result can be understood on the basis of a recent theory of Fogler, Teber and Shklovskii, which takes into account Coulomb correlations in a three-dimensional network of chain-like conductors and predicts a power-law density of states for charge excitations around the Fermi energy. At T>T*, σ (T) increases faster than at lower T, implying a tendency towards nearest-neighbour hopping by a reduction of the average hop length.