Basis-set correction based on density-functional theory: Rigorous framework for a one-dimensional model

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- Recently, we proposed a method for **accelerating the convergence of wave-function calculations with respect to the size of the basis $\mathcal{B}$**

$$E_0^{\mathcal{B}} = \langle \Psi^{\mathcal{B}} | \hat{H} | \Psi^{\mathcal{B}} \rangle + \bar{E}^{\mathcal{B}}[\rho_{\Psi^{\mathcal{B}}}]$$

- Here, we **rexamine this method** more closely for a **one-dimensional model Hamiltonian with delta-potential interactions**

- We give a new **formulation of the method** and we develop an **adapted local-density approximation (LDA) for the basis-set correction functional $\bar{E}^{\mathcal{B}}[\rho]$ for any basis $\mathcal{B}$** using a **finite uniform electron gas**