II. OLM-MEM WITH THE q-AVERAGE

A. q-Gaussian PDF

We consider N-unit nonextensive systems whose PDF, $p_q^{(N)}(\boldsymbol{x})$, is derived with the use of the OLM-MEM [5] for the Tsallis entropy given by Eq. (1) [1, 2]. We impose four constraints given by (for details, see Appendix B of Ref. [20])

$$1 = \int p_q^{(N)}(\boldsymbol{x})\, d\boldsymbol{x}, \tag{11}$$

$$\mu = \frac{1}{N}\sum_{i=1}^{N}[x_i]_q, \tag{12}$$

$$\sigma^2 = \frac{1}{N}\sum_{i=1}^{N}[(x_i-\mu)^2]_q, \tag{13}$$

$$s\,\sigma^2 = \frac{1}{N(N-1)}\sum_{i=1}^{N}\sum_{j=1(\neq i)}^{N}[(x_i-\mu)(x_j-\mu)]_q. \tag{14}$$

Here μ, σ^2 and s express the mean, variance, and degree of intrinsic correlation, respectively, and the bracket $[\cdot]_q$ denotes the q-average over the escort PDF, $P_q^{(N)}(\boldsymbol{x})$,

$$[Q]_q = \int P_q^{(N)}(\boldsymbol{x})\, Q(\boldsymbol{x})\, d\boldsymbol{x}, \tag{15}$$

with

$$P_q^{(N)}(\boldsymbol{x}) = \frac{\left(p_q^{(N)}(\boldsymbol{x})\right)^q}{c_q^{(N)}}, \tag{16}$$

$$c_q^{(N)} = \int \left(p_q^{(N)}(\boldsymbol{x})\right)^q\, d\boldsymbol{x}, \tag{17}$$

where $Q(\boldsymbol{x})$ stands for an arbitrary function of $\boldsymbol{x}$.

The OLM-MEM with the constraints given by Eqs. (11)-(14) leads to the PDF given by [20, 36]

$$p_q^{(N)}(\boldsymbol{x}) = \frac{1}{Z_q^{(N)}}\exp_q\left[-\left(\frac{1}{2\nu_q^{(N)}\sigma^2}\right)\Phi(\boldsymbol{x})\right], \tag{18}$$