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ERRATUM TO: "OSTROWSKI AND JENSEN TYPE INEQUALITIES FOR HIGHER DERIVATIVES WITH APPLICATIONS" [J. INEQUAL. SPEC. FUNCT. 7:1 (2016), 61–77]

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The paper [1] contains some errors. In Theorem 3.7, the right-hand side of the inequality in part (iv) is incorrect. The correct inequality is as follows:

$$\left|\int_\Omega f\circ g\,d\mu - f(\zeta) - \sum_{k=1}^{n} f^{(k)}(\zeta)\int_\Omega \frac{(g-\zeta)^k}{k!}\,d\mu\right|$$
$$\leq \frac{|f^{(n+1)}(\zeta)|}{n!\,(n+q+1)}\int_\Omega |g-\zeta|^{n+1}\,d\mu + \frac{\Gamma(q+1)}{\Gamma(n+q+2)}\int_\Omega |g-\zeta|^{n+1}\left|f^{(n+1)}\circ g\right|d\mu,$$

where Γ denotes the gamma function. The last two examples also contain some errors. In what follows, we restate the examples with corrections.

Example. *If we consider the convex function $f:(0,\infty)\to\mathbb{R}$, $f(t)=t\log(t)$, then*

$$I_f(p,q) = \int_\Omega p(t)\frac{q(t)}{p(t)}\log\left(\frac{q(t)}{p(t)}\right)d\,\mu(t) = \int_\Omega q(t)\log\left(\frac{q(t)}{p(t)}\right)d\,\mu(t) = D_{KL}(q,p).$$

We have $f'(t)=\log(t)+1$ and $f^{(k)}(t)=(-1)^k t^{-(k-1)}(k-2)!$, for $k\geq 2$. We have

$$\left|D_{KL}(q,p) - \zeta\log(\zeta) - (1-\zeta)(\log(\zeta)+1) - \sum_{k=2}^{n}\frac{(-1)^k\zeta^{-(k-1)}}{k^2-k}D_{\chi^k,\zeta}(p,q)\right|$$
$$\leq \frac{r^{-n}}{n^2+n}D_{|\chi|^{n+1},\zeta}(p,q),$$

for all $\zeta\in[r,R]$. When $\zeta=1$, we have

$$\left|D_{KL}(q,p) - \sum_{k=2}^{n}\frac{(-1)^k}{k^2-k}D_{\chi^k}(p,q)\right| \leq \frac{r^{-n}}{n^2+n}D_{|\chi|^{n+1}}(p,q).$$

Example. *If we consider the convex function $f:(0,\infty)\to\mathbb{R}$, $f(t)=-\log(t)$, then*

$$I_f(p,q) = -\int_\Omega p(t)\log\left(\frac{q(t)}{p(t)}\right)d\,\mu(t) = \int_\Omega p(t)\log\left(\frac{p(t)}{q(t)}\right)d\,\mu(t) = D_{KL}(p,q).$$

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We have $f^{(k)}(t) = (-1)^k t^{-k}(k-1)!$ *for* $k \geq 1$. *We have*

$$\left| D_{KL}(p,q) + \log(\zeta) - \sum_{k=1}^{n} \frac{(-1)^k \zeta^{-k}}{k} D_{\chi^k,\zeta}(p,q) \right| \leq \frac{r^{-(n+1)}}{n+1} D_{|\chi|^{n+1},\zeta}(p,q),$$

for all $\zeta \in [r,R]$. *When* $\zeta = 1$, *we have*

$$\left| D_{KL}(p,q) - \sum_{k=1}^{n} \frac{(-1)^k}{k} D_{\chi^k}(p,q) \right| \leq \frac{r^{-(n+1)}}{n+1} D_{|\chi|^{n+1}}(p,q).$$

References

[1] P. Cerone, S. S. Dragomir and E. Kikianty, *Ostrowski and Jensen type inequalities for higher derivatives with applications*, J. Inequal. Spec. Funct. **7** 1 (2016), 61–77.

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