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log partition function of exponential family

Asked 6 years, 1 month ago Active 6 years, 1 month ago Viewed 1k times



In an exponential family

1



is the log partition function

$$p_{\theta}(x) = \exp\left(h(x) + \sum_{i=1}^s \theta_i T_i(x) - \phi(\theta)\right)$$

$$\phi(\theta) = \log \int \exp\left(h(x) + \sum_{i=1}^s \theta_i T_i(x)\right)$$

always positive?

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asked Oct 23 '13 at 22:44



[Wintermute](#)

3,304 4 19 35

1 Answer



No. Take $f(x) = \lambda e^{-\lambda x}$, the exponential distribution. Then $\phi = -\log(\lambda)$ and $\lambda > 1$ gives you a negative ϕ and $0 < \lambda < 1$ gives you a positive ϕ .

3



edited Oct 23 '13 at 23:24

answered Oct 23 '13 at 23:16



[Alex R.](#)

28k 1 26 58



Is the sign always constant? – [Wintermute](#) Oct 23 '13 at 23:21



@mtiano see edit. – [Alex R.](#) Oct 23 '13 at 23:24

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