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The reconstruction of natural exponential families by their marginals. (English)

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Two-dimensional natural exponential families of distributions with cumulant function $k(\theta_1, \theta_2)$ are considered. It is shown that the following relations hold

$$\begin{aligned}k(\theta_1, \theta_2) &= k_1(\theta_1 + \beta_1(\theta_2)) + k_2(\theta_2) - k_1(\theta_1^0 + \beta_1(\theta_2)) \\ &= k_2(\theta_2 + \beta_2(\theta_1)) + k_1(\theta_1) - k_1(\theta_1^0 + \beta_2(\theta_1)),\end{aligned}$$

where k_1 and k_2 are the cumulant functions of the marginal distributions, β_1 and β_2 are some functions. Using marginals from the Morris class (i.e. the families in which the variance V is a quadratic function of the mean m : $V = Am^2 + Bm + C$) the author describes possible functions β_1 and β_2 and corresponding two-dimensional exponential families.

Reviewer: [R.E.Maiboroda \(Kyïv\)](#)

MSC:

[60E99](#) Distribution theory

[62F10](#) Point estimation

Cited in **1** Document

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Morris natural exponential family; cumulant function; bivariate exponential family of distributions; hyperbolic cosine distribution

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