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Characterizations of semiparametric regression estimation in Archimedean copulas. (English)

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A random process is called an Archimedean copula process (AC-process) if it has finite dimensional distribution functions $F(x_1, \dots, x_n) = B[\sum_{j=1}^n B^{-1}(F_j(x_j))]$, where F_j are some univariate distribution functions, B is n -differentiable on $[0, \gamma)$, $B(0) = 1$, $\lim_{t \rightarrow \gamma} B(t) = 0$ and $B(t) = 0$ for $t \geq \gamma$, $B'(t) < 0$ and $(-1)^k B^{(k)} \geq 0$, $k = 2, \dots, n$; B is said to be n -order monotone on $[0, \gamma)$, and completely monotone if $k \in \mathfrak{R}$ or $\gamma = \infty$. Here F is the distribution function of a random vector having marginals F_j .

Several AC-copulas are considered. The paper presents some characterizations using independence properties of ranks and order statistics, and representations of some classes of AC vectors via independent random variables. Several classes of bivariate and multivariate copula regression models are proposed, and semiparametric estimation procedures considered for them.

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MSC:

62H05 Characterization and structure theory for multivariate probability distributions; copulas
62G07 Density estimation

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sequential ranks; survival functions; copulas; characterizations; order statistics