Extremes of Gaussian chaos processes with trend

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Let $\boldsymbol{X}(t) = (X_1(t), \ldots, X_d(t))$ be a Gaussian vector process and $g(\boldsymbol{x}), \boldsymbol{x} \in \mathbb{R}^d$ a homogenous function. In this paper we are concerned with the exact tail asymptotics of the chaos process $g(\boldsymbol{X}(t))$ with trend over $[0, S]$. Both scenarios that $\boldsymbol{X}(t)$ is locally stationary and non-stationary are considered. Important examples include $\Pi_{i=1}^d X_i(t) - ct$ and chi-processes with trend, i.e., $\left(\sum_{i=1}^d b_i X_i^2(t)\right) - ct$.

Key Words: Gaussian chaos; Gaussian vector processes; Asymptotic methods; Pickands constant.