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PICKANDS–PITERBARG CONSTANTS FOR SELF-SIMILAR GAUSSIAN PROCESSES

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Abstract. For a centered self-similar Gaussian process $\{Y(t) : t \in [0,\infty)\}$ and $R \geqslant 0$ we analyze the asymptotic behavior of

$$\mathcal{H}_Y^R(T) = \mathbf{E}\exp\Big(\sup_{t\in[0,T]}\big(\sqrt{2}\,Y(t) - (1+R)\sigma_Y^2(t)\big)\Big)$$

as $T \to \infty$. We prove that $\mathcal{H}_Y^R = \lim_{T\to\infty}\mathcal{H}_Y^R(T) \in (0,\infty)$ for $R > 0$ and

$$\mathcal{H}_Y = \lim_{T\to\infty}\frac{\mathcal{H}_Y^0(T)}{T^\gamma} \in (0,\infty)$$

for suitably chosen $\gamma > 0$. Additionally, we find bounds for $\mathcal{H}_Y^R$, $R > 0$, and a surprising relation between $\mathcal{H}_Y$ and the classical Pickands constants.

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Key words and phrases: Gaussian process, extremes, Pickands constant, Piterbarg constant.

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