

Integral Risk Management in Engineering**15. December 2009****The distribution of the maximum
for a stationary Gaussian process**

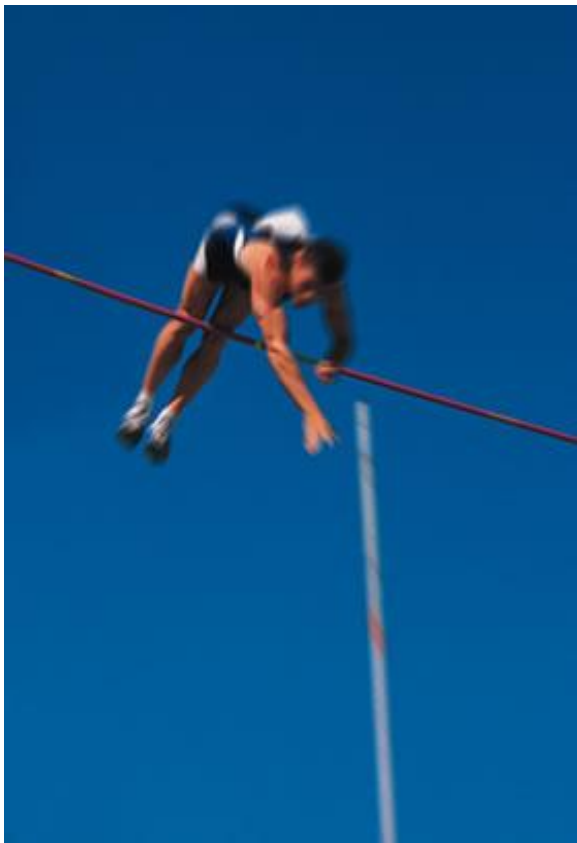
Tuesday, 15. December 2009

17:00 – 18:15, HIL E 6

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A classical problem of extreme value theory is the derivation of maximum distributions for stochastic processes. A standard example is the stationary Gaussian process $x(t)$. Till now the general form of the asymptotic maximum distribution is not completely known.

Assuming that the process has mean 0 and variance 1 and its autocorrelation function $r(t)$ has near zero the form $r(t) = 1 - |t|^\alpha + o(|t|^\alpha)$, $t \rightarrow 0$, with $0 < \alpha \leq 2$, the distribution of the maximum is $P(\max x(t) > u) \approx u^{-2/\alpha} \Phi(-u) H_\alpha$, $u \rightarrow \infty$, where $\Phi(\cdot)$ is the standard normal integral and H_α (called Pickands constant) is a constant depending only on α . This constant H_α is known only for $\alpha=1$ and $\alpha=2$. Here a simple derivation for this result is given and then the value of H_α is derived for all values $0 < \alpha \leq 2$.