Asymptotic Tail Dependence of the Normal Copula

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- An insurance company will pay $\begin{cases} \$X \text{ for personal injury} \\ \$Y \text{ for property damage} \end{cases}$ on a car insurance policy.
  Here, X and Y are random variables; we want to estimate the distribution of $X+Y$.
- 1st step: Estimate the **marginal distributions** of X and Y.
  2nd step: Estimate the **joint distribution** by modeling dependence using a **copula**.
  (joint distribution) = (marginal distributions) $\oplus$ (copula).
- **Normal copula** (Gaussian copula) comes from the bivariate normal distribution and is widely used in applications.
- **Tail dependence**: Given that X is large, how likely is it for Y to be large as well?
  Important in insurance/finance contexts.
  PROBLEM: The normal copula is said to lack tail dependence.

We looked more closely into the tail dependence of the normal copula.