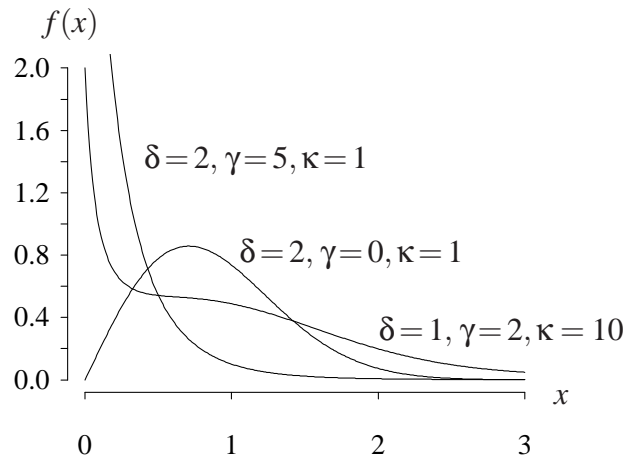**IDB distribution** (from)
The shorthand $X \sim \text{IDB}(\delta, \kappa, \gamma)$ is used to indicate that the random variable X has the IDB distribution with parameters δ, κ, and γ. An IDB random variable X with parameters δ, κ, and γ has probability density function

$$f(x) = \frac{((1 + \kappa x)\,\delta x + \gamma)\,e^{-1/(2\delta x^2)}}{(1 + \kappa x)^{\gamma/\kappa + 1}} \qquad x > 0,$$

for all $\delta > 0$, $\kappa > 0$, and $\gamma \geq 0$. The probability density function with three parameter settings is illustrated below.

The cumulative distribution, survivor, hazard, cumulative hazard, inverse distribution, moment generating, and characteristic functions on the support of X are mathematically intractable.
The population mean, variance, skewness, and kurtosis of X are mathematically intractable.

APPL failure: The APPL statements

```
assume(delta>0);
assume(kappa>0);
assume(y>=0);
X := [[x -> ((1 + kappa * x) * delta * x + y) / ((1 + kappa * x) ^ (y / kappa + 1))
        * exp(-delta * x ^ 2 / 2)], [0,infinity], ["Continuous", "PDF"]];
CDF(X);
SF(X);
HF(X);
CHF(X);
IDF(X);
```

fail to yield the cumulative distribution, survivor, hazard, cumulative hazard, and inverse distribution functions.