Theorem The log logistic(λ, κ) distribution is a special case of the Lomax(λ, κ) distribution when $\kappa = 1$.

Proof Let the random variable X have the Lomax(λ, κ) distribution with probability density function

$$f_X(x) = \frac{\lambda\kappa}{(1+\lambda x)^{\kappa+1}} \qquad x > 0.$$

When $\kappa = 1$, this becomes

$$f(x) = \frac{\lambda}{[1+\lambda x]^2} \qquad x > 0,$$

which is the probability density function of the log logistic(λ, κ) distribution when $\kappa = 1$.

APPL verification: The APPL statements

```
kappa := 1;
X := LomaxRV(kappa, lambda);
Y := LogLogisticRV(lambda, kappa);
```

yield identical the functional forms

$$f(x) = \frac{\lambda}{[1+(\lambda x)]^2} \qquad x > 0$$

for the random variables X and Y, which verifies that the log logistic(λ, κ) distribution is a special case of the Lomax(λ, κ) distribution when $\kappa = 1$.