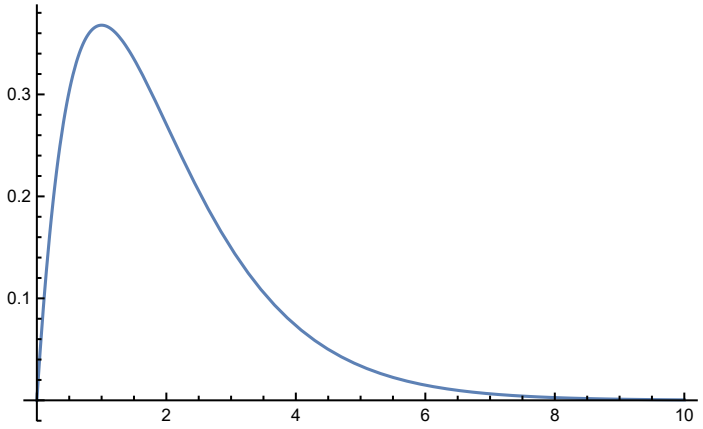
```
(* Jessica's Ricker model, aka, Gamma PDF kernel *)
```

In[1]:=
```
F1[a_, b_, t_] := a t Exp[-b t]
```

In[3]:=
```
Plot[F1[1, 1, t], {t, 0, 10}]
```

Out[3]=




```
(* Reparameterize above model interms of the value of t that
 maximizes the function (peakt), and the value of y at the max (maxy) *)
```

In[4]:=
```
∂t F1[a, b, t]
```

Out[4]=
$$a\, e^{-b\,t} - a\, b\, e^{-b\,t}\, t$$

In[5]:=
```
Solve[a e^-b t - a b e^-b t t == 0, t]
```

Out[5]=
$$\left\{\left\{t \to \frac{1}{b}\right\}\right\}$$

In[6]:=
```
Simplify[F1[a, b, 1 / b]]
```

Out[6]=
$$\frac{a}{b\, e}$$

```
(* Solve for original parameters (a and b)
 in terms of new parameters (peakt and maxy) *)
```

In[12]:=
```
Solve[{peakt == 1 / b, maxy == a / (b e)}, {a, b}]
```

Out[12]=
$$\left\{\left\{a \to \frac{e\, maxy}{peakt},\ b \to \frac{1}{peakt}\right\}\right\}$$

In[13]:=
```
FullSimplify[%]
```

Out[13]=
$$\left\{\left\{a \to \frac{e\, maxy}{peakt},\ b \to \frac{1}{peakt}\right\}\right\}$$

```
(* Rewrite function interms of new parameters *)
```

In[14]:=
```
FullSimplify[F1[ℯ maxy/peakt, 1/peakt, t]]
```

Out[14]=
$$\frac{e^{1-\frac{t}{peakt}}\, maxy\, t}{peakt}$$

In[15]:=
```
FullSimplify[Log[ℯ^(1 - t/peakt) maxy t/peakt]]
```

In[16]:=
```
FullSimplify[1 - t/peakt + Log[maxy] + Log[t] - Log[peakt]]
```

Out[16]=
$$1 - \frac{t}{peakt} + \text{Log}[maxy] - \text{Log}[peakt] + \text{Log}[t]$$

```
(* Function written in terms of new parameters, peakt and maxy *)
```

In[17]:=
```
F1v2[peakt_, maxy_, t_] := ℯ^(1 - t/peakt) t maxy/peakt
```

```
(* Log transformed versions of the new function *)
```

In[18]:=
```
LF1v2[peakt_, maxy_, t_] := 1 - t/peakt + Log[maxy] - Log[peakt] + Log[t]
```

```
(* interms of log-scale parameters, Lmaxy and Lpeakt *)
```

In[26]:=
```
LF1v3[Lpeakt_, Lmaxy_, t_] := 1 - t/Exp[Lpeakt] + Lmaxy - Lpeakt + Log[t]
```

```
(* Plot the different versions of the function to check that they are the same *)
```

In[27]:=
```
Plot[{F1v2[2, 2, t], Exp[LF1v2[2, 2, t]], Exp[LF1v3[Log[2], Log[2], t]]}, {t, 0, 15}]
```

Out[27]=