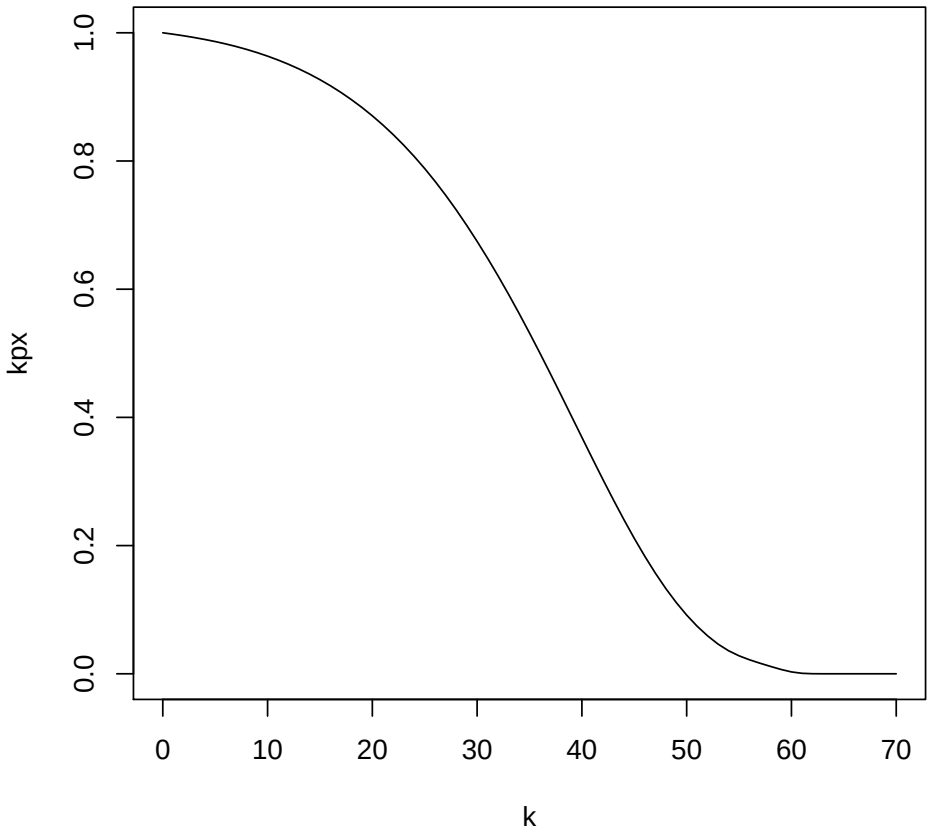
The classes are demonstrated below.

```
> library(stocins)
```

1 Survival Models

```
> mort = mortassumptions(list(x = 40, table = "MaleMort82"))
> plot(x = seq(0, 70, 1), y = kpx(seq(0, 70, 1), mort), xlab = "k",
+      ylab = "kpx", type = 'l')
```



2 Single Insurance Product

```
> oumodel = iratemodel(list(delta0 = 0.08, delta = 0.06,
+                           alpha = 0.1, sigma = 0.01), "ou")
```

2.1 Single Term Insurance Product

```
> termins = insurance(params = list(n=10, d=100, e=0),
+                     "isingle", "term")
> z.moment(1, termins, mort, oumodel)
```

```
[1] 2.332099
```

```
> z.sd(termins, mort, oumodel)
```

```
[1] 12.29139
```

```
> z.sk(termins, mort, oumodel)
```

```
[1] 5.334344
```

2.2 Single Endowment Insurance Product

```
> endowins = insurance(params = list(n=10, d=100, e=100),
+                      "isingle", "endow")
> z.moment(1, endowins, mort, oumodel)
```

```
[1] 49.32873
```

```
> z.sd(endowins, mort, oumodel)
```

```
[1] 7.358939
```

```
> z.sk(endowins, mort, oumodel)
```

```
[1] 1.255576
```

3 Insurance Portfolio

3.1 Term Insurance Portfolio

```
> termport10 = insurance(params = list(single = termins, c = 10),
+                        "iport", "term")
> termport1e09 = insurance(params = list(single = termins, c = 1e09),
+                          "iport", "term")
> z.moment(1, termport10, mort, oumodel) / termport10$c
```

```
[1] 2.332099
```

```
> z.sd(termport10, mort, oumodel) / termport10$c
```

```
[1] 3.889518
```

```
> z.sk(termport10, mort, oumodel)
```

```
[1] 1.695275
> z.moment(1, termport1e09, mort, oumodel) / termport1e09$c
[1] 2.332099
> z.sd(termport1e09, mort, oumodel) / termport1e09$c
[1] 0.1509841
> z.sk(termport1e09, mort, oumodel)
[1] 0.2741138
```

3.2 Endowment Insurance Portfolio

```
> endowport10 = insurance(params = list(single = endowins, c = 10),
+                         "iport", "endow")
> endowport1e09 = insurance(params = list(single = endowins, c = 1e09),
+                         "iport", "endow")
> z.moment(1, endowport10, mort, oumodel) / endowport10$c
[1] 49.32873
> z.sd(endowport10, mort, oumodel) / endowport10$c
[1] 6.382895
> z.sk(endowport10, mort, oumodel)
[1] 0.3568514
> z.moment(1, endowport1e09, mort, oumodel) / endowport1e09$c
[1] 49.32873
> z.sd(endowport1e09, mort, oumodel) / endowport1e09$c
[1] 6.265067
> z.sk(endowport1e09, mort, oumodel)
[1] 0.3900877
```

4 Group of Insurance Portfolios

```
> single1 = insurance(list(n=10, d=50,  e=50), "isingle", "endow")
> single2 = insurance(list(n=5,  d=100, e=50), "isingle", "endow")
> single3 = insurance(list(n=10, d=150, e=0),  "isingle", "endow")
> single4 = insurance(list(n=10, d=50,  e=0),  "isingle", "endow")
> single5 = insurance(list(n=10, d=100, e=100),"isingle", "endow")
```

```
> single6 = insurance(list(n=5,  d=75,  e=0),  "isingle", "endow")
> single7 = insurance(list(n=5,  d=25,  e=0),  "isingle", "endow")
> single8 = insurance(list(n=10, d=50,  e=50), "isingle", "endow")
> mort1 = mortassumptions(list(x = 30, table = "MaleMort82"))
> mort2 = mortassumptions(list(x = 35, table = "MaleMort82"))
> mort3 = mortassumptions(list(x = 50, table = "MaleMort82"))
> mort4 = mortassumptions(list(x = 30, table = "FemaleMort82"))
> mort5 = mortassumptions(list(x = 40, table = "FemaleMort82"))
> mort6 = mortassumptions(list(x = 40, table = "MaleMort82Reduced"))
> mort7 = mortassumptions(list(x = 45, table = "FemaleMort82Reduced"))
> mort8 = mortassumptions(list(x = 55, table = "FemaleMort82"))
> port1 = insurance(list(single = single1, c = 1000), "iport", "endow")
> port2 = insurance(list(single = single2, c = 2500), "iport", "endow")
> port3 = insurance(list(single = single3, c = 2000), "iport", "endow")
> port4 = insurance(list(single = single4, c = 1500), "iport", "endow")
> port5 = insurance(list(single = single5, c = 500), "iport", "endow")
> port6 = insurance(list(single = single6, c = 2500), "iport", "endow")
> port7 = insurance(list(single = single7, c = 3000), "iport", "endow")
> port8 = insurance(list(single = single8, c = 500), "iport", "endow")
> insgroup = insurance(list(port1, port2, port3, port4, port5,
+                           port6, port7, port8), "igroup")
> mortgroup = list(mort1, mort2, mort3, mort4, mort5,
+                  mort6, mort7, mort8)
> z.moment(1, insgroup, mortgroup, oumodel) / insgroup$c

[1] 12.64324

> z.moment(2, insgroup, mortgroup, oumodel) / insgroup$c^2

[1] 160.8296

> z.sd(insgroup, mortgroup, oumodel) / insgroup$c

[1] 0.9890085

> z.invrisk(insgroup, mortgroup, oumodel) / insgroup$c^2

[1] 0.9675637

> z.insrisk(insgroup, mortgroup, oumodel) / insgroup$c^2

[1] 0.01057409
```