#Example5.4 Table 4(7)

```
q := kappa1·(-x1 + 9) - 16·x1 + 3/2·x1^2·(-x1 + 9);
```

$$q := \kappa 1\ (-x1 + 9) - 16\ x1 + \frac{3\ x1^2\ (-x1 + 9)}{2} \tag{1}$$

```
q1 := diff(q, x1);
```

$$q1 := -\kappa 1 - 16 + 3\ x1\ (-x1 + 9) - \frac{3\ x1^2}{2} \tag{2}$$

```
r := RootFinding[Isolate]([q, q1], [kappa1, x1]);
RootFinding[Isolate]([q, kappa1 - 0.3], [kappa1, x1]);
RootFinding[Isolate]([q, kappa1 - 0.1], [kappa1, x1]);
RootFinding[Isolate]([q, kappa1 - 0.5], [kappa1, x1]);
```

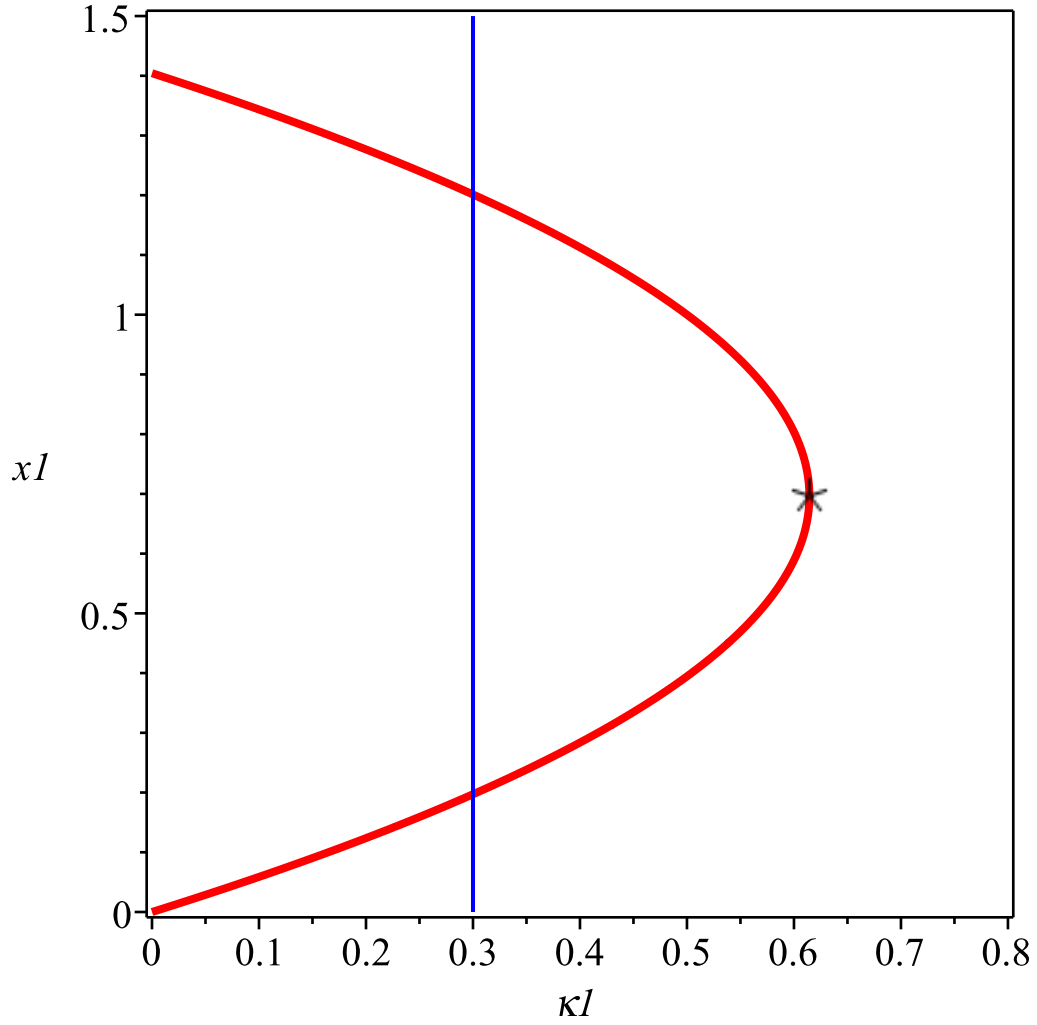
$$r := [[\kappa 1 = 0.6144164776,\ x1 = 0.6961103652],\ [\kappa 1 = -22.23407495,\ x1 = 6.222630911],\ [\kappa 1 = -269.3803415,\ x1 = 11.08125872]]$$

$$[[\kappa 1 = 0.3000000000,\ x1 = 0.1971213401],\ [\kappa 1 = 0.3000000000,\ x1 = 1.201246094],\ [\kappa 1 = 0.3000000000,\ x1 = 7.601632566]]$$

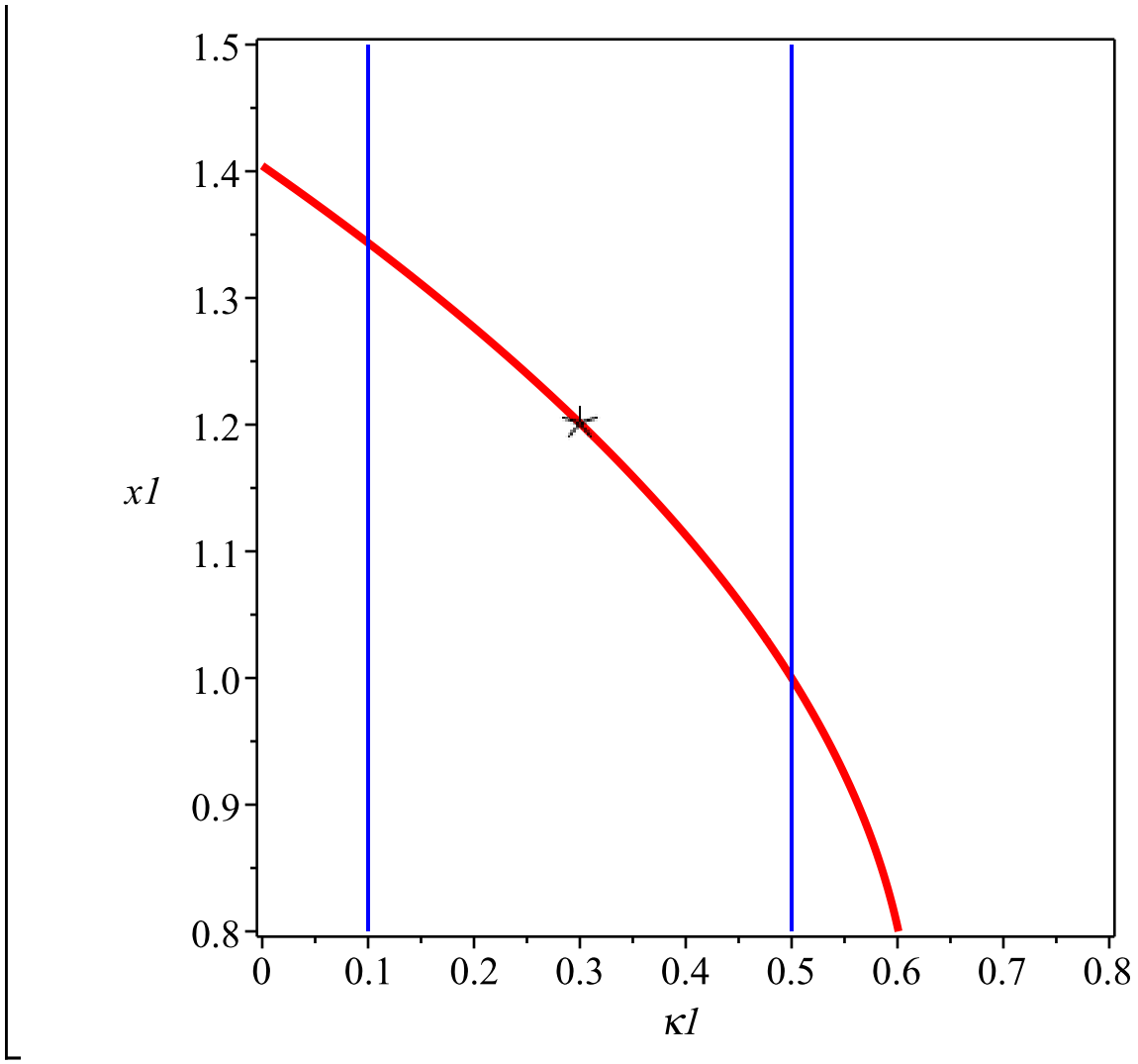
$$[[\kappa 1 = 0.1000000000,\ x1 = 0.05877869624],\ [\kappa 1 = 0.1000000000,\ x1 = 1.343538603],\ [\kappa 1 = 0.1000000000,\ x1 = 7.597682701]]$$

$$[[\kappa 1 = 0.5000000000,\ x1 = 0.3944487245],\ [\kappa 1 = 0.5000000000,\ x1 = 1.\ ],\ [\kappa 1 = 0.5000000000,\ x1 = 7.605551275]] \tag{3}$$

```
with(plots):
fig1 := implicitplot(q,  kappa1 = 0..1, x1 = 0..1.5, numpoints = 100000, color = "Red",
    thickness = 3, axes = boxed):
 fig2 := plot(Vector([0.6144164776]), Vector([0.6961103652]), style = point, symbol
    = asterisk, color = "Black", symbolsize = 25):
 fig3 := plot(Vector([0.3, 0.3]), Vector([0.1971213401, 1.201246094]), style = point,
    symbol = solidbox, color = "Black", symbolsize = 25):
  fig4 := implicitplot(kappa1 - 0.3, kappa1 = 0..1, x1 = 0..1.5, numpoints = 100000,
    color = "Blue"):
  fig5 := implicitplot(kappa1 - 0.8, kappa1 = 0..1, x1 = 0..1.5, numpoints = 100000,
    color = "White"):
 display(fig1, fig2, fig3, fig4, fig5);
```




```
> fig1 := implicitplot(q,  kappa1 = 0..0.8, x1 = 0.8..1.5, numpoints = 100000,
      color = "Red", thickness = 3, axes = boxed, view = [0..0.8, 0.8..1.5]):
  fig2 := plot(Vector([0.3]), Vector([1.201246094]), style = point, symbol
      = asterisk, color = "Black", symbolsize = 25):
  fig3 := plot(Vector([0.1, 0.5]), Vector([1.343538603, 1]), style = point, symbol
      = solidbox, color = "Black", symbolsize = 25):
   fig4 := implicitplot(kappa1 − 0.1, kappa1 = 0..0.8, x1 = 0.8..1.5, numpoints
     = 100000, color = "Blue"):
   fig5 := implicitplot(kappa1 − 0.5, kappa1 = 0..0.8, x1 = 0.8..1.5, numpoints
     = 100000, color = "Blue"):
  display(fig1, fig2, fig3, fig4, fig5);
```


1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
x1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
κl