```
> read `C:/Users/cgrie/Dynam Models Bio/M9.txt`;
  #Problem 1 find stable fixed points
> Help9()
```

$$Orb(f,x,x0,K1,K2),\ Orb2D(f,x,x0,K)\ ,\ FP(f,x)\ ,\ SFP(f,x)\ ,\ Comp(f,x) \quad (1)$$

```
> f:=3*x*(x-1);
  print("fp");
  FP(f,x,0.5,100,1020);
  print('sfp');
  SFP(f,x,0.5,100,1020);
```

$$f := 3\,x\,(x-1)$$

"fp"

$$[0.,\ 1.333333333]$$

sfp

$$[\ ] \quad (2)$$

```
> #there are no stable fixed points for k=3.6, as there is an
  oscillation between 1.33333 and 0
> #Solve by hand
  #f(x)=3.6*x*(1-x)
  #Set 0 = f(x) to get the fixed points
      #x=0 and x=1
  #thus f'(x)=3.6 - 7.2*x
     #Plugging in 0, we get 3.6 which has greater than an absolute
  value of 1
     #Plugging in 1 we get -3.6 which has greater than absolute
  value of 1
     #Therefore, no stable points exist




> #Feigenbaum's second constant (denoted as "alpha") is around
  2.5029...
  #
  #The second constant is defined as the separation of adjacent
  elements of Period Doubled Attractors from #one double to the
  next
      #Page Source: "https://archive.lib.msu.
  edu/crcmath/math/math/f/f052.htm"
      #THis is from the 1990 Rasband Book

  #\alpha alternates in sign for each step so 2.5029... is actually
  the absolute value of the ratio of the distances of the forks of
  consecutive bifurcations
    #Therefore, eventually the widths decrease in a geometric
  pattern.
     #does this have something to deal with flipping across the
  slope of 0.5
Error, control character `\a` unexpected
> #What does this width actually mean?
  #alpha is actually used as a way to approximate the famous
```

```
constant 4.66...
#by having a
```