In[1]:=
```
d1 = Sqrt[3] / 6
eq1 = k1 == f[t + (1 / 2 - d1) * h, y[t] + 1 / 4 * h * k1 + (1 / 4 - d1) * k2]
eq2 = k2 == f[t + (1 / 2 + d1) * h, y[t] + (1 / 4 + d1) * h * k1 + 1 / 4 * h * k2]
method = y[t + h] == y[t] + h * (1 / 2 * k1 + 1 / 2 * k2)
```

Out[1]=
$$\frac{1}{2\sqrt{3}}$$

Out[2]=
$$k1 == f\left[\left(\frac{1}{2} - \frac{1}{2\sqrt{3}}\right) h + t,\ \frac{h\,k1}{4} + \left(\frac{1}{4} - \frac{1}{2\sqrt{3}}\right) k2 + y[t]\right]$$

Out[3]=
$$k2 == f\left[\left(\frac{1}{2} + \frac{1}{2\sqrt{3}}\right) h + t,\ \left(\frac{1}{4} + \frac{1}{2\sqrt{3}}\right) h\,k1 + \frac{h\,k2}{4} + y[t]\right]$$

Out[4]=
$$y[h + t] == h\left(\frac{k1}{2} + \frac{k2}{2}\right) + y[t]$$

In[5]:=
```
f = Function[{t, y}, lambda * y]
```

Out[5]=
```
Function[{t, y}, lambda y]
```

In[15]:=
```
eq1m = eq1 /. {h → 1, lambda → z}
eq2m = eq2 /. {h → 1, lambda → z}
methodm = method /. {h → 1, lambda → z}
```

Out[15]=
$$k1 == z\left(\frac{k1}{4} + \left(\frac{1}{4} - \frac{1}{2\sqrt{3}}\right) k2 + y[t]\right)$$

Out[16]=
$$k2 == z\left(\left(\frac{1}{4} + \frac{1}{2\sqrt{3}}\right) k1 + \frac{k2}{4} + y[t]\right)$$

Out[17]=
$$y[1 + t] == \frac{k1}{2} + \frac{k2}{2} + y[t]$$

In[18]:=
```
y = Function[t, w ^ t]
```

Out[18]=
$$\text{Function}\left[t,\ w^{t}\right]$$

In[25]:=
```
eq1w = eq1m /. t → 0
eq2w = eq2m /. t → 0
methodw = methodm /. t → 0
```

Out[25]=
$$k1 == \left(1 + \frac{k1}{4} + \left(\frac{1}{4} - \frac{1}{2\sqrt{3}}\right) k2\right) z$$

Out[26]=
$$k2 == \left(1 + \left(\frac{1}{4} + \frac{1}{2\sqrt{3}}\right) k1 + \frac{k2}{4}\right) z$$

Out[27]=
$$w == 1 + \frac{k1}{2} + \frac{k2}{2}$$

In[29]:=
```
s1 = Solve[{eq1w, eq2w, methodw}, {k1, k2, w}]
```

Out[29]=
$$\left\{\left\{k1 \to -\frac{2\left(-6\,z+\sqrt{3}\,z^2\right)}{12-6\,z+z^2},\ k2 \to \frac{2\,z\left(6+\sqrt{3}\,z\right)}{12-6\,z+z^2},\ w \to -\frac{-12-6\,z-z^2}{12-6\,z+z^2}\right\}\right\}$$

In[38]:=
```
wabs = (Abs[w] /. s1)[[1]]
w1abs = wabs /. z → a + I * b
```

Out[38]=
$$\text{Abs}\left[\frac{-12-6\,z-z^2}{12-6\,z+z^2}\right]$$

Out[39]=
$$\text{Abs}\left[\frac{-12-6\,(a+i\,b)-(a+i\,b)^2}{12-6\,(a+i\,b)+(a+i\,b)^2}\right]$$

In[43]:=
```
ContourPlot[w1abs, {a, -1.5, 1.5}, {b, -1.5, 1.5},
Contours -> {1}, ContourShading -> {Red, Blue}]
```

Out[43]=