In[1]:=
```
Off[InterpolatingFunction::dmval]
```

In[3]:=
```
P[x_] := x + 1
Q[x_] := 20 / ((x + 1) ^ 2)
F[x_] := 5 * (x + 1) ^ 5
```

In[6]:=
```
a0 = 5
a1 = 1
```

Out[6]=
```
5
```

Out[7]=
```
1
```

In[8]:=
```
b0 = 1
b1 = 0
```

Out[8]=
```
1
```

Out[9]=
```
0
```

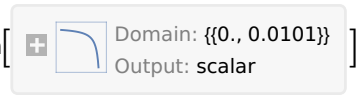
In[10]:=
```
g0 = 0
g1 = 32
```

Out[10]=
```
0
```

Out[11]=
```
32
```

In[12]:=
```
U = NDSolve[{
u1'[x] == -u1[x] ^ 2 * Q[x] + u1[x] * P[x] + 1,
u2'[x] == -u1[x] * (u2[x] * Q[x] + F[x]),
u1[0] == -5, u2[0] == 0
}, {u1, u2}, {x, 0, 1}]
```

NDSolve: At x == 0.0100566, step size is effectively zero; singularity or stiff system suspected.

Out[12]=
```
{{u1 → InterpolatingFunction[  ],
  u2 → InterpolatingFunction[  ]}}
```


In[13]:=
```
U1[x_] := Evaluate[u1[x] /. U]
U2[x_] := Evaluate[u2[x] /. U]
```

In[15]:=

```
Y = NDSolve[{
y[x] == U1[x] * y'[x] + U2[x],
y[1] == (g1 * U1[1] + b1 * U2[1]) / (b1 + a1 * U1[1])
}, y, {x, 0, 1}]
```

Out[15]=

```
{{y → InterpolatingFunction[ Domain: {{0., 1.}}
                             Output dimensions: {1} ]}}
```

In[16]:=

```
x = Range[0, 1, .1]
```

Out[16]=

```
{0., 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.}
```

In[17]:=

```
y = First@First@Evaluate[y[#] /. Y] & /@ x
```

Out[17]=

```
{31.9809, 31.9538, 31.9589, 31.9641, 31.9692,
 31.9743, 31.9795, 31.9846, 31.9897, 31.9949, 32.}
```

In[18]:=

```
k = Range[0, 10]
```

Out[18]=

```
{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
```

In[25]:=

```
u1 = First@U1[#] & /@ x
u2 = First@U2[#] & /@ x
```

Out[25]=

$$\{-5.,\ -4.16924\times10^{54},\ -3.92664\times10^{55},\ -1.39665\times10^{56},\ -3.39745\times10^{56},\ -6.73886\times10^{56},\ -7.8587\times10^{57},\ -1.25707\times10^{58},\ -1.88672\times10^{58},\ -2.69778\times10^{58},\ -3.71322\times10^{58}\}$$

Out[26]=

$$\{0.,\ 2.13978\times10^{53},\ 2.01527\times10^{54},\ 7.16803\times10^{54},\ 1.74367\times10^{55},\ 3.45858\times10^{55},\ 4.03332\times10^{56},\ 6.45167\times10^{56},\ 9.68321\times10^{56},\ 1.38458\times10^{57},\ 1.90574\times10^{57}\}$$

In[51]:=

```
Grid[Join[{{"k", "x", "u1", "u2", "y"}}, {k, x, u1, u2, y} // Transpose], Frame → All]
```

Out[51]=

k	x	u1	u2	y
0	0.	−5.	0.	31.9809
1	0.1	-4.16924×10^{54}	2.13978×10^{53}	31.9538
2	0.2	-3.92664×10^{55}	2.01527×10^{54}	31.9589
3	0.3	-1.39665×10^{56}	7.16803×10^{54}	31.9641
4	0.4	-3.39745×10^{56}	1.74367×10^{55}	31.9692
5	0.5	-6.73886×10^{56}	3.45858×10^{55}	31.9743
6	0.6	-7.8587×10^{57}	4.03332×10^{56}	31.9795
7	0.7	-1.25707×10^{58}	6.45167×10^{56}	31.9846
8	0.8	-1.88672×10^{58}	9.68321×10^{56}	31.9897
9	0.9	-2.69778×10^{58}	1.38458×10^{57}	31.9949
10	1.	-3.71322×10^{58}	1.90574×10^{57}	32.