First-order (forward) Euler method for the QHO

stepsize

```
h = .01000000000000000000000000000000;
```

number of steps

```
n = 1000;
```

Guess for energy (in units of 1/2 hbar ω)

```
ϵ = 1.00568791374638021174000000000;

u = 0.00000000000000000000000000000000;
```

Look for odd solutions

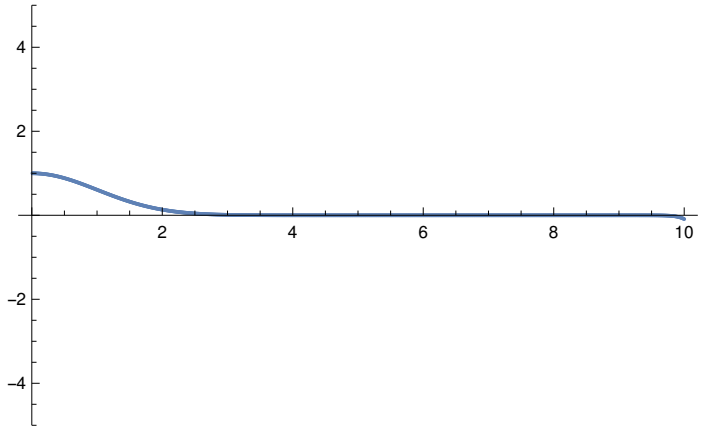
```
y1 = 0.00000000000000000000000000000000;
y2 = 1.00000000000000000000000000000000;
```

Look for even solutions

```
y1 = 1.00000000000000000000000000000000;
y2 = 0.00000000000000000000000000000000;

For[i = 1, i <= n, i++,
 u = u + h;
 temp1 = y1;
 temp2 = y2;
 y1 = temp1 + h * temp2;
 y2 = temp2 + h * (u^2 - ϵ) * temp1;
 a[i] = u; b[i] = y1;
]
```

```
ListPlot[Table[{a[i], b[i]}, {i, 1, n}], PlotRange → {-5, 5}]
```




```
ListPlot[Table[{a[i], b[i]}, {i, 1, n}], PlotRange → {-0.1, 1.1}]
```