

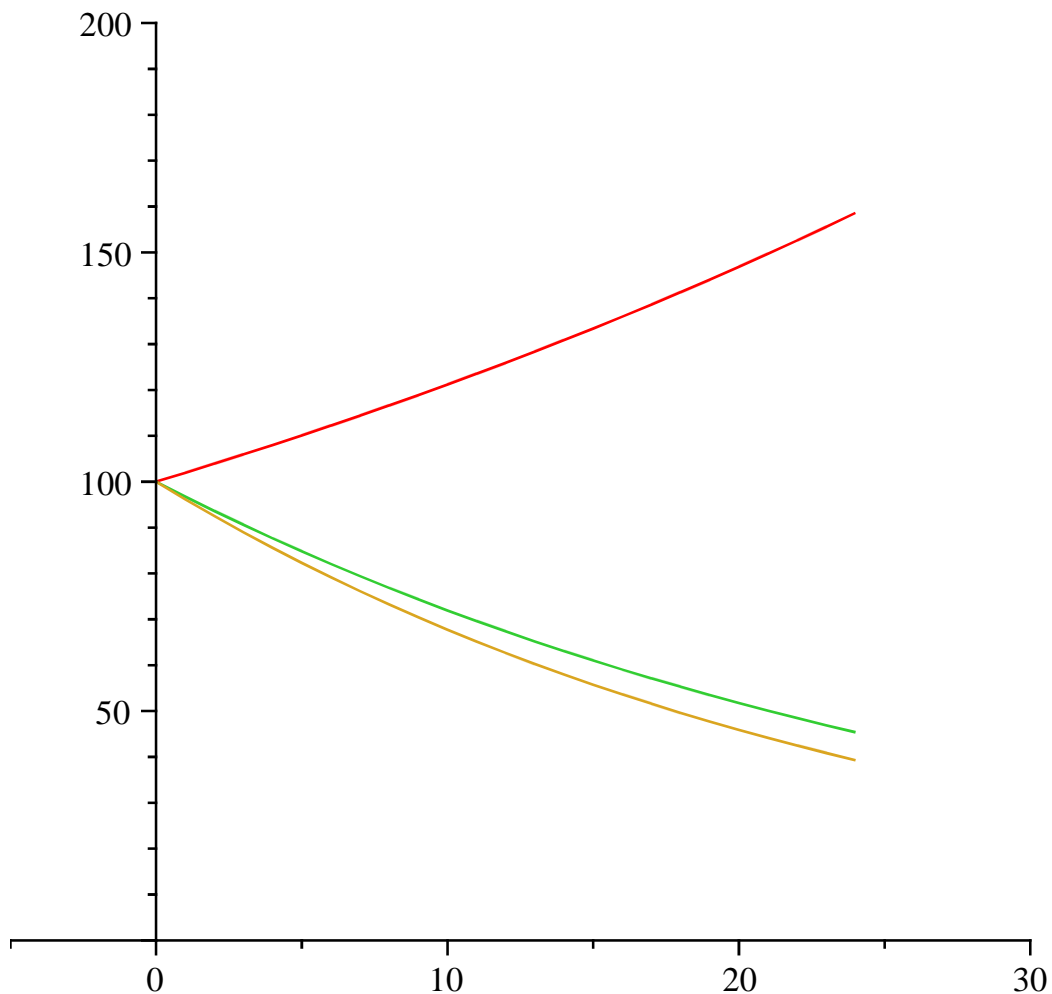
Hacking chick

The best case: $x(n+1) = x(n) + 0.0194 \cdot x(n)$

The median case: $x(n+1) = x(n) - 0.0324 \cdot x(n)$

The worst case: $x(n+1) = x(n) - 0.0382 \cdot x(n)$

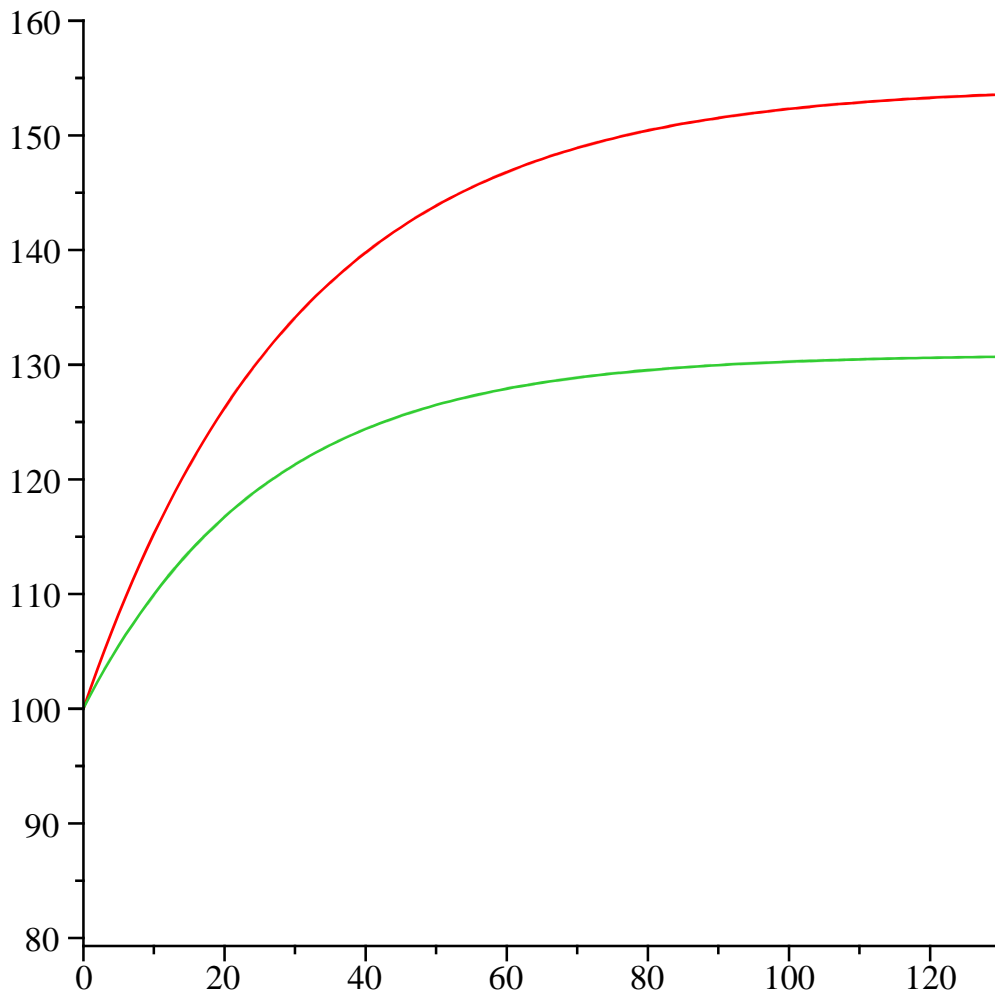
```
> n := 24 : #number of years
rb, rm, rw := 0.0194, -0.0324, -0.0382 : # best, median, worst rate
b, m, w := array(0..n), array(0..n), array(0..n) : # open space for b,m,w
b[0], m[0], w[0] := 100, 100, 100 :
for k from 1 to n do
  b[k] := b[k-1] · (1 + rb) :
  m[k] := m[k-1] · (1 + rm) :
  w[k] := w[k-1] · (1 + rw) :
end do
> plot( [ [seq( [k, b[k]], k=0..n) ], [seq( [k, m[k]], k=0..n) ], [seq( [k, w[k]], k=0..n) ] ], view
= [-5..30, 0..200]);
```



```
>
```

The median case: $x(n+1) = x(n) - 0.0324 \cdot x(n) + 5$
 The worst case: $x(n+1) = x(n) - 0.0382 \cdot x(n) + 5$

```
> n := 130 : #number of years
  m, w := array(0..n), array(0..n) :
  m[0], w[0] := 100, 100 :
  for k from 1 to n do
    m[k] := m[k-1] * (1 + rm) + 5 :
    w[k] := w[k-1] * (1 + rw) + 5 :
  end do:
> plot([seq([k, m[k]], k=0..n)], [seq([k, w[k]], k=0..n)], view=[0..130, 80..160]);
```



```
> ?piecewise
```

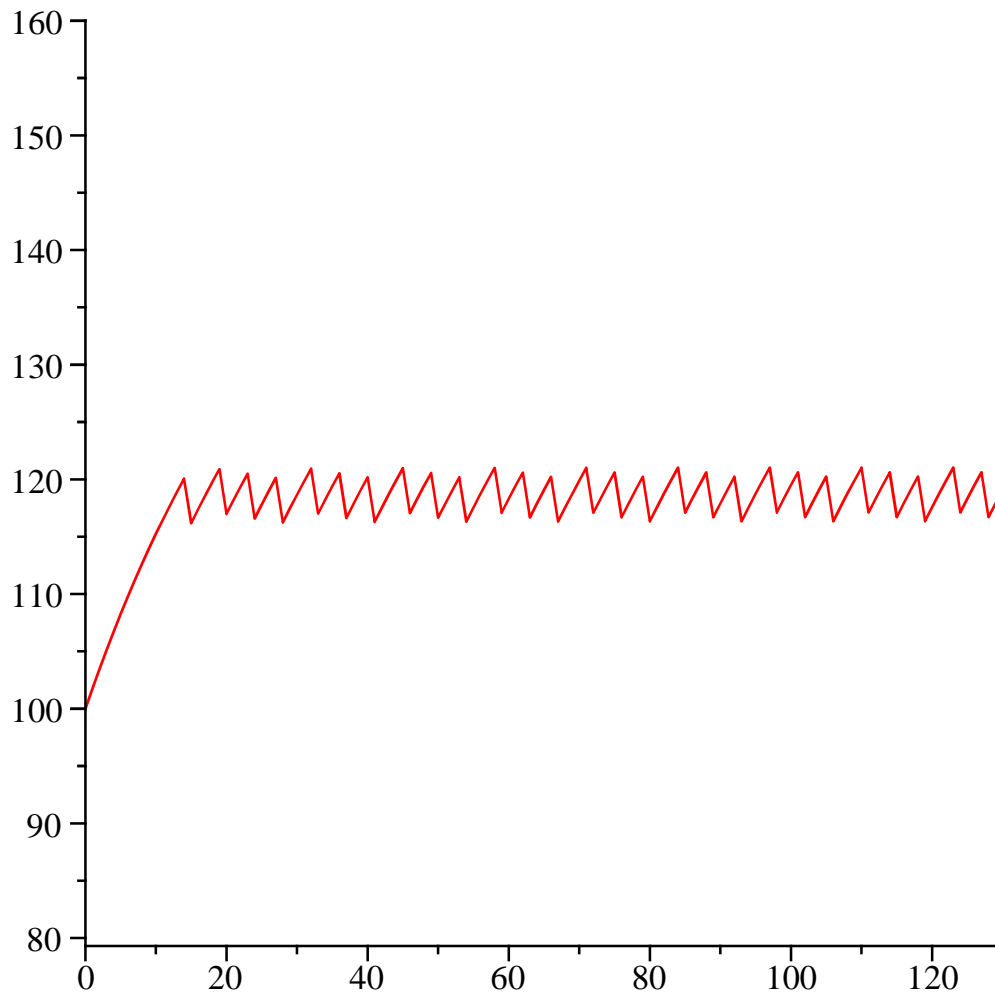
Additional case: Adding 5 chicks only if the total is less than 120

$$\text{The median case: } x(n+1) = x(n) - 0.0324 \cdot x(n) + \begin{cases} 5 & x(n) < 120 \\ 0 & x(n) \geq 120 \end{cases}$$

```

> n := 130 : #number of years
  m := array(0..n) :
  m[0] := 100 :
  for k from 1 to n do
    if m[k-1] < 120 then
      s := 5 :
    else
      s := 0 :
    end if;
    m[k] := m[k-1] · (1 + rm) + s :
  end do;
> plot([seq([k, m[k]], k = 0..n)], view = [0..130, 80..160]);

```



```

> n := 210 : #number of years

```

```
m1, m2, m3 := array(0..n), array(0..n), array(0..n) :
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```
m1[0], m2[0], m3[0] := 200, 90, 20 :
```

```
for k from 1 to n do
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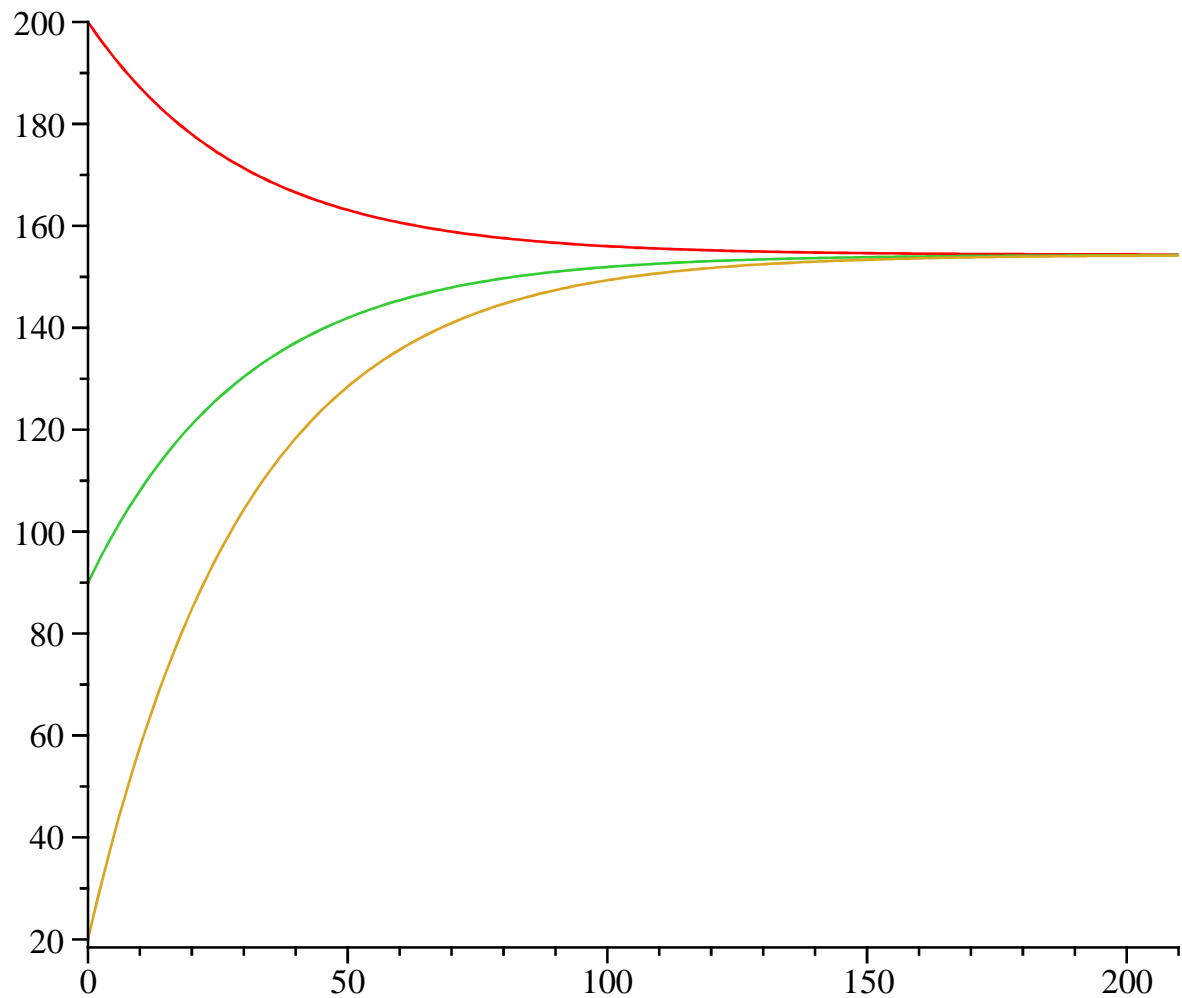
```
  m1[k] := m1[k - 1] · (1 + rm) + 5 :
```

```
  m2[k] := m2[k - 1] · (1 + rm) + 5 :
```

```
  m3[k] := m3[k - 1] · (1 + rm) + 5 :
```

```
end do:
```

```
plot( [[seq( [k, m1[k]], k=0..n) ], [seq( [k, m2[k]], k=0..n) ], [seq( [k, m3[k]], k=0..n) ] ] );
```



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