#R3(4) = (p1 * R3(3, p1, p2, p3, c0, c1, c2) + p2 * R3(2, p1, p2, p3, c0, c1, c2) + p3 * R3(1, p1, p2, p3, c0, c1, c2))

#R(0) = c0, R(1) = c1, R(2) = c2
#expected number of females born at time n

```
> R3 := proc(n, p1, p2, p3, c0, c1, c2) option remember:
  if n = 0 then
   c0:
  elif n = 1 then
   c1:
  elif n = 2 then
   c2:
  else
  expand(p1 * R3(n - 1, p1, p2, p3, c0, c1, c2) + p2 * R3(n - 2, p1, p2, p3, c0, c1, c2) + p3
      * R3(n - 3, p1, p2, p3, c0, c1, c2));
   fi:
  end:

   seq(R3(i, 1, 1, 1, 1, 1, 1), i = 0 ..4);
```

1, 1, 1, 3, 5 **(1)**

```
>
>
> seq(R3(i, 0.01, 0.01, 0.01, 1, 1, 1), i = 1000)
      #using values that are very small will lead to population extinction
```

$1.161296512\ 10^{-629}$ **(2)**

```
> seq(R3(i, .99, .99, .99, 1, 1, 1), i = 1000)
      #using values that are large will lead to population explosion
```

$3.944437002\ 10^{261}$ **(3)**

```
> seq(R3(i, .5, .5, .5, 1, 1, 1), i = 990 ..1010)
      #using values around 0.5 will lead to stable population
```

$1.561649093\ 10^{90}$, $1.926687580\ 10^{90}$, $2.377054517\ 10^{90}$, $2.932695594\ 10^{90}$, $3.618218845\ 10^{90}$, $4.463984477\ 10^{90}$, $5.507449457\ 10^{90}$, $6.794826388\ 10^{90}$, $8.383130160\ 10^{90}$, $1.034270300\ 10^{91}$, $1.276032977\ 10^{91}$, $1.574308146\ 10^{91}$, $1.942305712\ 10^{91}$, $2.396323418\ 10^{91}$, $2.956468638\ 10^{91}$, $3.647548884\ 10^{91}$, $4.500170470\ 10^{91}$, $5.552093996\ 10^{91}$, $6.849906675\ 10^{91}$, $8.451085571\ 10^{91}$, $1.042654312\ 10^{92}$ **(4)**