```
num[c_] := Numerator[c]; den[c_] := Denominator[c]
alpha[n_, c_] := den[c] (Floor[n / den[c]] - Floor[(n - 1) / den[c]]) -
  num[c] (Floor[n / num[c]] - Floor[(n - 1) / num[c]])
alpha2[n_, c_] := (Floor[n] - Floor[n - 1 / den[c]]) - c (Floor[n / c] - Floor[n / c - 1 / num[c]])
ff[n_, k_, c_] := Sum[
  If[alpha2[j, c] == 0, 0, alpha2[j, c] ff[n / j, k - 1, c]], {j, 1 + 1 / den[c], n, 1 / den[c]}]
ff[n_, 0, c_] := 1
E2[n_, k_, c_] :=
 E2[n, k, c] = (1 / den[c]) Sum[If[alpha[j, c] == 0, 0, alpha[j, c] E2[(den[c] n) / j, k - 1, c]],
    {j, den[c] + 1, den[c] n}]; E2[n_, 0, c_] := 1
f2[n_, k_, b_] := -(1 + 1 / b) f2[n / (1 + 1 / b), k - 1, b] +
  Sum[f2[n / j, k - 1, b] - (1 + 1 / b) f2[n / (j + 1 / b), k - 1, b], {j, 2, n}]
f2[n_, 0, b_] := 1
f2a[n_, k_, b_] := If[n / (1 + 1 / b) < 1, 0, -(1 + 1 / b) f2a[n / (1 + 1 / b), k - 1, b]] +
  Sum[f2a[n / j, k - 1, b], {j, 2, n}] -
  Sum[(1 + 1 / b) f2a[n / (j + 1 / b), k - 1, b], {j, 2, n / (1 + 1 / b)}]
f2a[n_, 0, b_] := 1
f2b[n_, k_, b_] := If[n / (1 + 1 / b) < 1, 0, -(1 + 1 / b) f2b[n / (1 + 1 / b), k - 1, b]] +
  Sum[f2b[n / j, k - 1, b], {j, 2, n}] -
  Sum[(1 + 1 / b) f2b[n / (j + 1 / b), k - 1, b], {j, 2, Floor[n / (1 + 1 / b)]}]
f2b[n_, 0, b_] :=
 1
```

```
ff[100, 4, 3 / 2]
```

$$\frac{337}{4}$$

```
E2[100, 4, 3 / 2]
```

$$\frac{337}{4}$$

```
c (Floor[n den[c] / num[c]] - Floor[(n den[c] - 1) / num[c]])
```

$$c\left(-\text{Floor}\left[\frac{-1+n}{c}\right]+\text{Floor}\left[\frac{n}{c}\right]\right)$$

```
(Floor[n] - Floor[n - 1 / den[c]]) - c (Floor[n / c] - Floor[n / c - 1 / num[c]]) /. c -> 5 / 4
```

$$1-\frac{5}{4}\left(-\text{Floor}\left[-\frac{4}{5}+\frac{4\,n}{5}\right]+\text{Floor}\left[\frac{4\,n}{5}\right]\right)$$

```
f2b[10, 3, 100]
```

$$-\frac{79\,809}{62\,500}$$

```
E2[10, 3, 101 / 100]
```

$$-\frac{79\,809}{62\,500}$$

```
ff[10, 2, 101 / 100]
```

$$\frac{31\,823}{10\,000}$$

```
Table[ Floor[(n + 1 / 100) / (1 + 1 / (2000))], {n, 2, 10}]
```

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