

Extra exercises Complexiteit IBC028

April 15, 2015

Exercise 1.

Let $f = \text{fib}$ be defined by $f(i) = i$ for $i = 0, 1$ and $f(i) = f(i-1) + f(i-2)$ for $i > 1$. Prove by induction on n that

$$\begin{pmatrix} 0 & 1 \\ 1 & 1 \end{pmatrix}^n = \begin{pmatrix} f(n-1) & f(n) \\ f(n) & f(n+1) \end{pmatrix}$$

for all $n \geq 1$.

Exercise 2.

Let $f = \text{fib}$ be defined by $f(i) = i$ for $i = 0, 1$ and $f(i) = f(i-1) + f(i-2)$ for $i > 1$. Prove by induction on n that

$$f(n-1)f(n+1) = f(n)^2 + 1$$

if n is even, and

$$f(n-1)f(n+1) = f(n)^2 - 1$$

if n is odd, for all $n \geq 1$.