Social Data Science: Machine Learning & Econometrics

Exercise class 9

February 19, 2020

Todays quick warmup

Chebyshevs polynomials of the first kind are defined recursively by

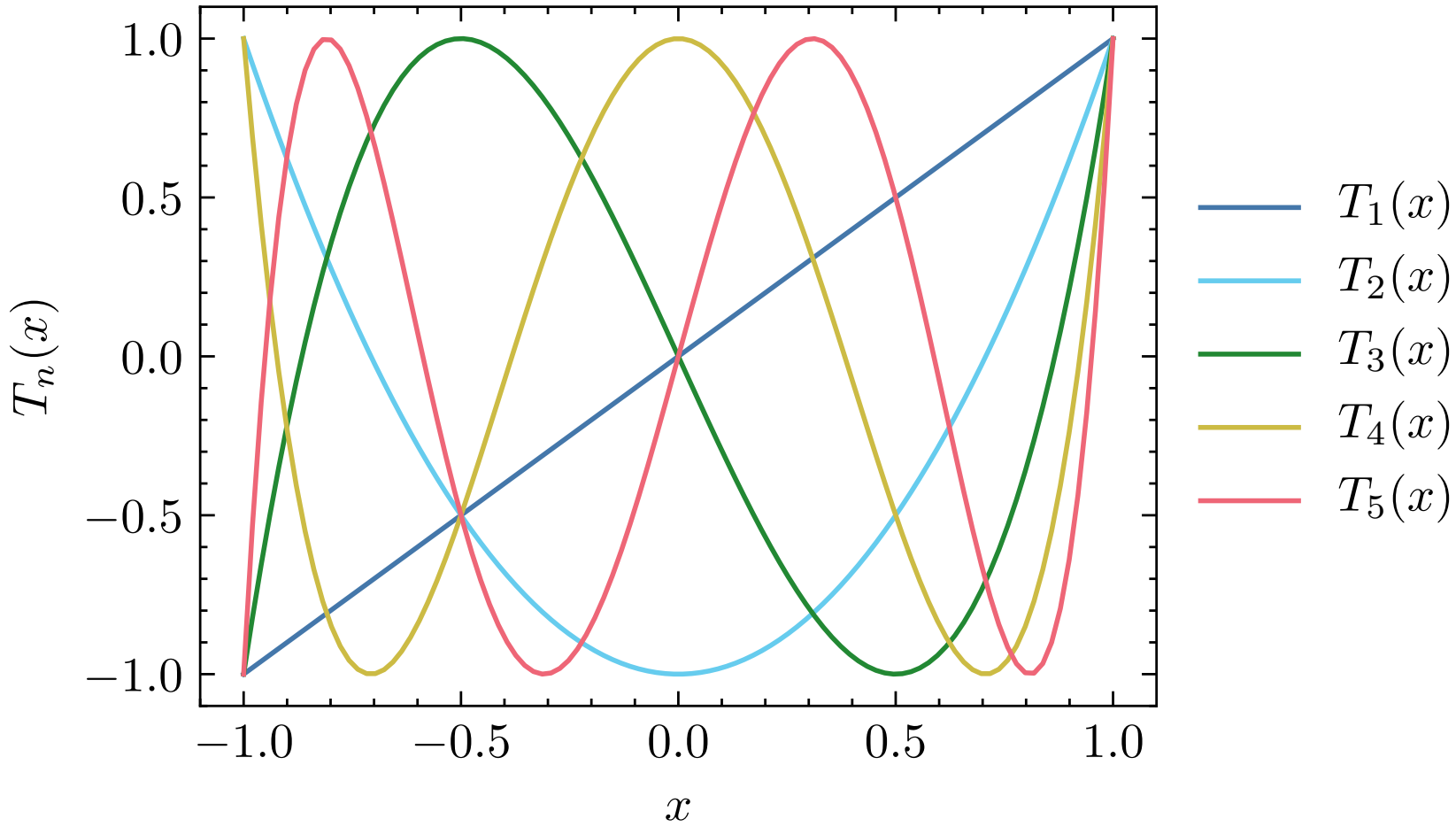
$$T_0(x) = 1$$
$$T_1(x) = x$$
$$T_n(x) = 2xT_{n-1}(x) - T_{n-2}(x)$$

Write a *factory function* `TnFactory(n)` that returns as its output the *function* $T_n(x)$.

Hint: you need to reactivate your knowledge on recursive functions!

Bonus: plot on $x \in (-1, 1)$ the first five Chebyshev polynomials $T_1, ..., T_5$.

Todays quick warmup - solution



Todays quick warmup - solution

```
def TnFactory(n):
    if n == 0: return lambda x: 1
    if n == 1: return lambda x: x
    return lambda x: (2 * x * TnFactory(n-1)(x)
                      - TnFactory(n-2)(x))
```