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"""
Série 1 : Rappel
Date : 14-09-2023
Groupe : Ipein/SM4/GB
"""
# Exercice 2
def saisie_deg():
   while 1:
       try:
           n = int(input("entier n >0, n="))
           if n>0:
               return n
       except :
           print("Erreur...")

def saisie_poly(n):
   p = [] #liste represente un polynome
   for i in range (n+1):
       while 2:
           try:#essayer
               coef = float(input("coef="))
               if (i<n) or (i==n and coef != 0):
                   p.append(coef)
                   break # arrêter while
           except : #s'il y a une exception
               continue
   return p

def derive(p):
   d = []
   for i in range(1,len(p)):
       d.append(p[i]*i)
   return d

def opp_poly(p):
   return [-c for c in p]

def add_poly(p1,p2):
   n1, n2 = len(p1), len(p2)
   p = [p1[i] + p2[i] for i in range(min(n1,n2))]
   p += p1[n2:] if n1>n2 else p2[n1:]

   while len(p)>0  and p[-1]== 0:
       p.pop(-1)

   return [0] if p==[] else p

def mul_poly(p1,p2):
   n1, n2 = len(p1), len(p2)
   p  = [0]*(n1 + n2 - 1)
   for i in range(n1):
       for j in range(n2):
           p[i+j] += p1[i] * p2[j]
   return p

def sp(p,k):
   assert type(k)==int and k>=0
   assert type(p)==list
   if k==0 : return p
   elif k==1 : return opp_poly(derive(p))
   else:
       sp0 = p
       for i in range(2,k+1):
           sp1 = opp_poly(derive(sp0))
           q = mul_poly(sp1,sp0)
           sp2 = add_poly(mul_poly(q , sp1), sp0)
           sp0 = sp1
           sp1 = sp2

   return sp2
```