

z5173405 JIE MEI

Question 2

According to the question, we will apply the Karatsuba trick algorithm. Note that using substitution $y = x^{100}$ reduce $P(x)$ to $P(y) = A_0 + A_1y + A_2y^2$. The degree of $P^2(y)$ is 4. So, the uniquely determine $C(y)$ need 5 of its values. We will evaluate $P(y)$ at 5 values of its argument x , assuming $x = -2, -1, 0, 1, 2$. Then we will get coefficients from these 5 values, by solving the corresponding system of linear equation in coefficients C_0, \dots, C_4 . Thus, we solve the system $\{\sum_{j=0}^4 c_j i^j = C(i) : -2 \leq i \leq 2\}$. Finally, we will form the polynomial $C(j) = c_0 + c_1x \dots + c_4x^4$ with thus obtained c_j and finally substitute back y with x^{100} obtaining $C(x) = P(x) * P(x)$