CMPSCI 145 Homework
Parametric Equations
Professor William T. Verts

1. There are three points in 4-dimensional space defined as follows:

***P0:*** ***<4,8,2,5>***
***P1:*** ***<10,2,6,9>***
***P2:*** ***<2,12,9,1>***

Generate the parametric equations for each of the four dimensions. Each equation will be of the form $F(t) = at^2 + bt + c$, where ***a***, ***b***, and ***c*** are constants (numbers). Refer to the four dimensions as $x$, $y$, $z$, and $w$, so the four equations you will generate will be as follows (fill in the blanks with the correct constants):

***x(t) =*** ____$t^2$ + ____$t$ + ____
***y(t) =*** ____$t^2$ + ____$t$ + ____
***z(t) =*** ____$t^2$ + ____$t$ + ____
***w(t) =*** ____$t^2$ + ____$t$ + ____

2. I want to pass a quartic function through five points $P_0$, $P_1$, $P_2$, $P_3$, and $P_4$. The curve should go through $P_0$ at $t=0$, $P_1$ at $t=¼$, $P_2$ at $t=½$, $P_3$ at $t=¾$, and $P_4$ at $t=1$. Fill in the following template for LaGrange Interpolation to show how we would go about generating the parametric equations for this problem (you do not need to reduce the equations).

$$\frac{(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)}{(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)}P_0 +$$

$$\frac{(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)}{(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)}P_1 +$$

$$\frac{(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)}{(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)}P_2 +$$

$$\frac{(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)}{(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)}P_3 +$$

$$\frac{(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)(t-\_\_\_)}{(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)(\_\_\_-\_\_\_)}P_4$$