3. $f(t) = B_0(t) P_0 + B_1(t) P_1 + B_2(t) P_2 + B_3(t) P_3$

$B_0(t) = (1-t)^3 \quad B_1(t) = 3t(1-t)^2 \quad B_2(t) = 3t^2(1-t) \quad B_3(t) = t^3$

$t = u$

$f(u) = (1-u)^3 P_0 + 3u(1-u)^2 P_1 + 3u^2(1-u) P_2 + u^3 P_3$

$f(u)^2 = t_0$

$t_0 = (1-u)s_0 + u s_1 = (1-u)((1-u)r_0 + u r_1) + u((1-u)r_1 + u r_2)$

$= (1-u)\left[(1-u)((1-u)P_0 + uP_1) + u((1-u)P_1 + uP_2)\right] +$

$u\left[(1-u)((1-u)P_1 + uP_2) + u((1-u)P_2 + uP_3)\right]$

$= (1-u)^3 P_0 + u(1-u)^2 P_1 + u(1-u)^2 P_1 + u(1-u)^2 P_1 +$

$u^2(1-u) P_2 + u^2(1-u) P_2 + u^2(1-u) P_2 + u^3 P_3$

$= (1-u)^3 P_0 + 3u(1-u)^2 P_1 + 3u^2(1-u) P_2 + u^3 P_3 = F(u)$