Determining the coeffecients of quartic polynomial related to ball collision

This is a quadratic problem for determining ball-rail collisions.

Assumption:
1) The rail extends infinitely

Let a line L by defined by
$l_x x + l_y y + l_0 = 0$

The distance from a point P to a line L is

$$D = \frac{|l_x r_x + l_y r_y + l_0|}{\text{sqrt}\left(l_x^2 + l_y^2\right)}$$

Setting D = R gives us a quadratic with coeffecients, A, B, C: $A t^2 + B t + C = 0$

$A t^2 + B t + C = 0$

$$A t^2 + B t + C = 0 \quad \textbf{(1)}$$

Where:

$A = l_x a_x + l_y a_y$
$B = l_x b_x + l_y b_y$
$C = l_0 + l_x c_x + l_y c_y \pm R\ \text{sqrt}\left(l_x^2 + l_y^2\right)$

$a_x, b_x, c_x, a_y, b_y, c_y$ are all determined based on either a rolling or sliding state (see ball_ball_time.pdf). If the ball is stationary, there is no collision.

The real, non-negative solutions to Equation (1) yields the time for the collision to occur.