Based on: <https://www.researchgate.net/publication/276493313_RSSI-based_Algorithm_for_Indoor_Localization>

Distance between pi and device:

di2 = (xi – x0)2 + (yi – y0)2 + (zi – z0)2

* di2 = xi2 + yi2 + zi2 - 2xix0 – 2yiy0 – 2ziz0 + x02 + y02 + z02

Where xi, yi, and zi are coordinate of pi number i

x0, y0 and z0 are coordinate of the device

Suppose distances between the device and 3 pis are known:

d12 = x12 + y12 + z12 - 2x1x0 – 2y1y0 – 2z1z0 + x02 + y02 + z02 (1)

d22 = x22 + y22 + z22 - 2x2x0 – 2y2y0 – 2z2z0 + x02 + y02 + z02 (2)

d32 = x32 + y32 + z32 - 2x3x0 – 2y3y0 – 2z3z0 + x02 + y02 + z02 (3)

Subtract (2) from (1):

d12 – d22 = x12 + y12 + z12 – x22 – y22 – z22 – 2(x1 – x2)x0 – 2(y1 – y2)y0 – 2(z1 – z2)z0

* 2(x1 – x2)x0 + 2(y1 – y2)y0 + 2(z1 – z2)z0 = x12+ y12 + z12 – x22 – y22 – z22 – d12 + d22

Let a12 = 2(x1 – x2)

b12 = 2(y1 – y2)

c12 = 2(z1 – z2)

e12 = x12+ y12 + z12 – x22 – y22 – z22 – d12 + d22

* a12x0 + b12y0 + c12z0 = e12 (4)

Similarly, subtract (3) from (2):

a23x0 + b23y0 + c23z0 = e23 (5)

subtract (1) from (3):

a31x0 + b31y0 + c31z0 = e31 (6)

The coordinate of device can be solved using Cramer’s Rule on (4), (5) and (6)