First of all, Let`s define mi to be the i-th minutia of an image and we can use xi, yi to describe its position and θ represents its angle. Now we think about an MRC between mi and mj with a neighbor minutia mp.

We need to calculate hij and lij. Vip is a vector from mi to mp and vij is a vector for mi to mj. Hij equals vip cross multiply by vij and divide by Lip, which is the distance between mi and mj. You can see there are two typos in the original paper. For lij, we can use the Pythagorean Theorem to calculate it easily.

Next, two empty matrixes are made for right and left sides of Lij. Both of the matrixes are Ns by Nd. NS is the number of divided space information, ND is the number of divided direction information. To fill them, we perform the two equations like Gaussian distribution. Then we concatenate left MRC and right MRC together to get MRCij. Additionally, a bit ordered MRC named bMRCij can be calculated by this equation. Cenergy is the summation value of MRCij and Nnorm is the normalization factor. To be more specific, this limitation on distance between two minutia was introduced , we can describe the whole template of image I by this equation.