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| **Algorithm 2 Inner loop algorithm** |
| **Input : your mother boom** |
| **Output :** |
| **1 :** |
| **2 :** |
| **3 : Calculate using (5), and obtain using function A** |
| **4 :** |
| **5 : Initialize as as** |
| **6 : Initialize t=0,** |
| **7 : obtain by calculating (14) using** |
| **8 :** |
| **9 : Obtain using to calculate (15)** |
| **10 : Obtain using to calculate (14)** |
| **11 :** |
| **12 :** |
| **13 :** |
| **14 :** |
| **15 : Update all the Lagrange multipliers using（16）** |
| **16 : ,** |
| **17 :** |
| **18 :** |
| **19 :** |
| **20 :** |
| **21 :** |
| **22 :** |

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| **Algorithm 1 Pre-Matching Algorithm** | | |
| **Input** | **:** |  |
| **Output** | **:** |  |
| **1: Initialize** | | |
| **2: for do** | | |
| **3:** | | |
| **4: for do** | | |
| **5: obtain using (8), obtain using (7)** | | |
| **6: if then** | | |
| **7: Remove current k from** | | |
| **8: end if** | | |
| **9: end for** | | |
| **10: if = then** | | |
| **11: add to** | | |
| **12: elseif then** | | |
| **13: add to** | | |
| **14: end if** | | |
| **15: add to** | | |
| **16 : end for** | | |

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| **Algorithm 4 Preference list** |
| **Input :,,** |
| **Output :** |
| **1:** |
| **2:** |
| **3: and place k into in descending order of** |
| **4:** |
| **5:** |
| **6:** |
| **7:** |
| **8:** |
| **9: obtain caused by i using (17), and place i into in ascending order of** |
| **10:** |
| **11:** |

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| **Simulation parameter** | **Value** |
| **Radius of Cellular Network** | **250m** |
| **Number of D2D links N** |  |
| **Number of CUE links M** |  |
| **D2D communication distance** |  |
| **Path loss exponent** | **3** |
| **EH power segment []** | **[10 100 230.06 57368] uw** |
| **EH linear function coefficient []** | **[0 0.3899 0.6967 0.1427]** |
| **EH linear function intercept []** | **[0 -1.6613 -19.1737 108.2778]** |
| **Maximum harvested power** | **250uw** |
| **Max transmission power** | **23dBm** |
| **Circuit power consumption** | **20dBm** |
| **CUE transmission power** | **23dBm** |
| **Initial Lagrange multipliers** | **0.1** |
| **Noise power** | **-100dBm** |
| **Throughput requirement of D2D link i** | **2bits/Hz** |
| **Throughput requirement of CUE k** | **1bit/Hz** |

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| **Algorithm 5: One-to-one Stable Matching Algorithm** |
| **Input :,** |
| **Output:** |
| **1:** |
| **2:** |
| **3: Let propose its most preferred CUE in** |
| **4:** |
| **5: k is the most preferred CUE for** |
| **6: receives only one proposal from then** |
| **7: will be matched with , and removed** |
| **8: receives not only one proposal** |
| **9: any of them has only one preferred CUE** |
| **10: will be matched with , and removed** |
| **11: They all have more than one preferred CUE** |
| **12: Match the CUE based on its preference list , and the matched D2D link will be removed** |
| **13:** |
| **14:** |
| **15:** |
| **16:** |
| **17: deletes its most preferred CUE from** |
| **18:** |
| **19:** |
| **20: Gather all the unmatched CUEs in** |

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| **Algorithm 3 Outer loop Algorithm** |
| **Input :** |
| **Output :** |
| **1：** |
| **2：** |
| **3: Obtain using (5), and obtain** |
| **4:** |
| **5:** |
| **6: Assign** |
| **7:** |
| **8:** |
| **9:** |