# 1.

原问题的对偶问题为

# 2.

原问题的对偶问题为

（这个定理太强了，原来b不知道是多少，对偶用一下就能求出来）

# 3.

此非对称形式的线性规划问题的对偶问题是

# 4.

（1）

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | -1 | 0 | -3 | 1 | 0 | -3 |
|  | 0 | -1 | -2 | 0 | 1 | -5 |
| 检验系数 | -4 | -6 | -18 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  | 0 | 1 |  | 0 | 1 |
|  |  | 1 | 0 |  | -1 | 3 |
| 检验系数 | -2 | 0 | 0 | -2 | -6 | 36 |

（2）

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | 1 | -1 | -1 | 0 | 0 | 1 |
|  | 1 | -1 | -2 | 1 | 0 | -1 |
|  | 1 | 1 | 0 | 0 | 1 | M |
| 检验系数 | 1 | 1 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | 1 | 0 | 0 | 0 | 1 | M+1 |
|  | 0 | 0 | 1 | -1 | 0 | 2 |
|  | 0 | 1 | 0 | 1 | 1 | M-2 |
| 检验系数 | 0 | 0 | 0 | -1 | -2 | 1-2M |

从表中可以看出，当M取很大的时候，min问题没有下界，即max的原问题无上界

（3）

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  | -2 | 1 | 1 | 1 | -1 | 1 | 0 | 0 | -3 |
|  | 1 | 1 | -3 | 2 | -2 | 0 | 0 | 1 | 4 |
|  | -1 | -1 | 1 | 1 | -1 | 0 | 1 | 0 | -2 |
| 检验系数 | -4 | -3 | -5 | -1 | -2 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  | 2 | -1 | -1 | -1 | 1 | -1 | 0 | 0 | 3 |
|  | 5 | -1 | -5 | 0 | 0 | -2 | 0 | 1 | 10 |
|  | 1 | -2 | 0 | 0 | 0 | -1 | 1 | 0 | 1 |
| 检验系数 | 0 | -5 | -7 | -3 | 0 | -2 | 0 | 0 | 6 |