7.1 LINGO Code

LINGO:Dragon to the Map of China (Multipurpose):

```
MODEL:

SETS:

   fc: a;

   mt: b;

   mr: f;

   LINKS( fc, mt, mr): c, d, e;

ENDSETS


DATA:


   a = 1   …1;(477 ones in total)
b =  1     …1;(477 ones in total)
f = 1…1;(477 ones in total) d=Distance Matrix
e=Including Angle Vector Matrix
ENDDATA
   MIN = @SUM( LINKS( I, J): 0.5 * c( I, J) * d( I, J) - 0.5 * c(I, J) * e( I, J));



   @FOR( mt( J):

     @SUM( fc( I): c( I, J)) = b(j));

  @FOR( mr( J):

     @SUM( fc( I): c( I, J)) = f(j));



   @FOR( fc( I):

     @SUM( mt( J): c( I, J)) < a( I));

  @FOR( fc( I):

     @SUM( mr( J): c( I, J)) < a( I));


@FOR( mt( J):
@FOR( mr( J):
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```
@FOR( fc( I): @gin(c(i,j))));

END
```

LINDO： Dragon to the Map of China, Ground to Ferris Wheel Result(Bee Nest)

```
MODEL:

SETS:

   fc: a;

   mt: b;

   LINKS( fc, mt): c, d;

ENDSETS


DATA:


   a = 1   …1;(477 ones in total)
b =  1     …1;(477 ones in total)
d=Distance Matrix
ENDDATA



   MIN = @SUM( LINKS( I, J):    c( I, J) * d( I, J));



   @FOR( mt( J):

     @SUM( fc( I): c( I, J)) = b(j));



   @FOR( fc( I):

     @SUM( mt( J): c( I, J)) < a( I));

@FOR( mt( J):

@FOR( fc( I): @gin(c(i,j))));

END
```

LINDO： Ferris Wheel to Dragon Head

```
MODEL:
```

```
SETS:

   fc: a;

   mt: b;

   LINKS( fc, mt): c, d;

ENDSETS


DATA:


   a = 1   …1;(477 ones in total)
b =  1     …1;(78 ones in total)
d=Distance Matrix
ENDDATA



   MIN = @SUM( LINKS( I, J):    c( I, J) * d( I, J));



   @FOR( mt( J):

     @SUM( fc( I): c( I, J)) = b(j));



   @FOR( fc( I):

     @SUM( mt( J): c( I, J)) < a( I));

@FOR( mt( J):

@FOR( fc( I): @gin(c(i,j))));

END
```

LINDO： Ferris Wheel to Dragon Tail

```
MODEL:

SETS:

   fc: a;

   mt: b;

   LINKS( fc, mt): c, d;
```

```
ENDSETS


DATA:


   a = 1   …1;(399 ones in total)
b =  1     …1;(167 ones in total)
d=Distance Matrix
ENDDATA



   MIN = @SUM( LINKS( I, J):    c( I, J) * d( I, J));



   @FOR( mt( J):

     @SUM( fc( I): c( I, J)) = b(j));



   @FOR( fc( I):

     @SUM( mt( J): c( I, J)) < a( I));

@FOR( mt( J):

@FOR( fc( I): @gin(c(i,j))));

END
```

LINDO： Ferris Wheel to Dragon Body

```
MODEL:

SETS:

   fc: a;

   mt: b;

   LINKS( fc, mt): c, d;

ENDSETS


DATA:
   a = 1   …1;(232 ones in total)
b =  1     …1;(232 ones in total)
d=Distance Matrix
ENDDATA



   MIN = @SUM( LINKS( I, J):    c( I, J) * d( I, J));



   @FOR( mt( J):

     @SUM( fc( I): c( I, J)) = b(j));



   @FOR( fc( I):

     @SUM( mt( J): c( I, J)) < a( I));

@FOR( mt( J):

@FOR( fc( I): @gin(c(i,j))));

END
```