**Additional file 10.**

the object function is constructed as follows:

 (10)

subject to

 (11)

where denotes the normalized indicator value.

To solve the object function (10), the Lang range function is introduced and defined as follows:



Let



Alternatively, it can be represented by the following matrix Eq. (12)

|  |
| --- |
|  |

Where,

|  |  |  |
| --- | --- | --- |
|  |  | (12) |

By solving Eq. (13), the combined weight vector  is calculated as the following Eq. (13)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | (13) |  |