Author's response

We got fourth review from two reviewers during discussion interval. The reviewers talked about many factors in the paper. We tried to reflect comments on revised manuscript. We believe that the paper is substantially improved as the result of the revision. We wrote point-by-point response (in blue) to reviewer's comments (in red). Also, we put revised part of the manuscript in black.

<Reviewer 4>

1) Please check if is reasonable to use the temr 'Multi-community detection'. Originally, it should be 'Multiresolution community detection'. I don't think this abbreviation delivers the same meaning.

   - We checked meaning of the both words and agreed with the reviwer opinion. So, we changed the term as 'Multiresolution communtiy detection' in abstract, application and results and conclusion.

     - (Line 15) …… entropy and multiresolution community detection.
     - (Line 22) Keywords: ……., Multiresolution community detection
     - (Line 150) Therefore, the multiresolution community detection method can ….
     - (Line 322) …. Vital node identification and multiresolution community detection ...

2) Plase change Eqs. 6 and 7 in a more formal way. Should not there be parentheses if they are condition al formulas ?

   - We checked Eqs. 6 and 7 and then changed the equations like bleow.

     - $$I_P(e_{ij}) = \begin{cases} \sum_{p=1}^{P} \alpha_p \times \frac{\sigma(path_p(v_i,v_j))}{\min(w_i,w_j)}, & e_{ij} \in E \\ 0, & otherwise \end{cases} \quad (6)$$
     - $$v_j = \begin{cases} v_j \in V,\ I_P(e_{ij}) > t \\ v_j \in c_u,\ I_P(e_{ij}) > t \end{cases} \quad (7)$$

3) Please check Eq. 9, make sure it is in the right form. If i remember correctly, the current form is not correct. Should be g(a) ∈ P, isn't it ?

   - We checked Eq. 9 and found that expression of the first sigma. We changed the Eq. 9 like below

     - $$Q = \frac{1}{2m} \sum_{g_a \in P} \sum_{i,j \in g_a} (A_{ij} - \frac{k_i k_j}{2m}) \quad (9)$$