I have no special knowledge of the measurement of information flow in a network meta-analysis and so I read this paper as a biostatistician with a general interest in meta-analysis.

I like the idea of associating a descriptive measure of importance to each edge in a network and the authors of this paper present an interesting step in that direction, though my feeling is that this proposal will not turn out to be the final solution. I have two areas of concern, one is to do with terminology and the other with the scope of applicability of the proposal approach.

In criticising the terminology, I have to accept that the authors are largely following common practice and so my criticisms are partly aimed at the meta-analysis community. None the less there were three things that irritated me. Firstly, throughout the paper, proportions are referred to as percentages. Next, the title of the paper says it is about "the contribution of studies in network meta-analysis" while actually it is about the contribution of different effect estimates. Finally, the measure adopted is the weight given to each effect estimate when calculating the pooled estimate. In this paper and elsewhere in the meta-analysis literature, this weight is called a contribution. Perhaps I am being too pedantic but weight and contribution are different ideas and it does not help when the terminology confuses them.

Now the proposed method. Taking the example from the paper, the authors note that the pooled estimate of the xy effect can be calculated from,

$$\hat{\theta}_{xy} = \phi_1 \hat{\theta}^D_{xy} + \phi_2 \hat{\theta}^I_{xvy} + \phi_3 \hat{\theta}^I_{xvuy}$$

where $\hat{\theta}^I_{xvy}$ is the indirect estimate of xy along the path xvy. Further it is true, at least for this example, that

$$\sum L_i \phi_i = 1$$

where L_i is the length of the path. So we can attach the weights ϕ to the edges of the network, sum them when an edge contributes to more than one estimate and the resulting weights will sum to one over the whole network.

This argument works for the example presented in the paper but it is not clear to me what conditions have to hold for it to work generally. The authors note in the paper that including a multi-arm trial in the meta-analysis would cause a problem, presumably because some of the direct or indirect estimates would not be independent. Are there any other conditions that have to hold? for example, can we have any structure of random effects in the meta-analysis model? what about the Bayesian models that are often used for network meta-anlysis?

The authors take the matrix, H, which projects individual estimates such as xy, xu, uy etc. into their predicted values under the meta-analysis model

and they present an algorithm for converting those values into weights that are equivalent to the ϕ's. The algorithm is sensible and works for the simple example in the paper but one is again left wondering whether or not it works under all circumstances. Afterall, the algorithm is presented without any proof that it works.

My own feeling is that a contribution is best measured by the sledgehammer approach of analysing the network with and without a particular edge, but the authors' suggested method is much less computationally demanding and I think that it would be appreciated by many applied researchers provided they were certain that it could be safely used with their particular network and their particular meta-analysis model.