

Methodological Aspect of Emergy Accounting in Co-Production Branching Systems

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Abstract : Emergy accounting of the systems networks is guided by a definite rule called 'emergy algebra'. The systems networks consist of two types of branching. These are the co-product branching and split branching. The emergy accounting procedure for both the branching types is different. According to the emergy algebra, each branch in the co-product branching has different transformity values whereas the split branching has the same transformity value. After the transformity value of each branch is determined, the emergy is calculated by multiplying this with the energy. The aim of this research is to solve the problems in determining the transformity values in the co-product branching through the introduction of a new methodology, the modified physical quantity method. Initially, the existing methodologies for emergy accounting in the co-product branching is discussed and later, the modified physical quantity method is introduced with a case study of the Eucalyptus pulp production. The existing emergy accounting methodologies in the co-product branching has wrong interpretations with incorrect emergy calculations. The modified physical quantity method solves those problems of emergy accounting in the co-product branching systems. The transformity value calculated for each branch is different and also applicable in the emergy calculations. The methodology also strictly follows the emergy algebra rules. This new modified physical quantity methodology is a valid approach in emergy accounting particularly in the multi-production systems networks.

Keywords : co-product branching, emergy accounting, emergy algebra, modified physical quantity method, transformity value

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