

Accepted Manuscript

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PII: S0020-0255(18)30372-4
DOI: [10.1016/j.ins.2018.05.017](https://doi.org/10.1016/j.ins.2018.05.017)
Reference: INS 13647



To appear in: *Information Sciences*

Received date: 31 July 2017
Revised date: 1 May 2018
Accepted date: 4 May 2018

Please cite this article as: I.J. Pérez, F.J. Cabrerizo, S. Alonso, Y.C. Dong, F. Chiclana, E. Herrera-Viedma, On Dynamic Consensus Processes in Group Decision Making Problems, *Information Sciences* (2018), doi: [10.1016/j.ins.2018.05.017](https://doi.org/10.1016/j.ins.2018.05.017)

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On Dynamic Consensus Processes in Group Decision Making Problems

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Abstract

Consensus in group decision making requires discussion and deliberation between the group members with the aim to reach a decision that reflects the opinions of every group member in order for it to be acceptable by everyone. Traditionally, the consensus reaching problem is theoretically modelled as a multi stage negotiation process, i.e. an iterative process with a number of negotiation rounds, which ends when the consensus level achieved reaches a minimum required threshold value. In real world decision situations, both the consensus process environment and specific parameters of the theoretical model can change during the negotiation period. Consequently, there is a need for developing dynamic consensus process models to represent effectively and realistically the dynamic nature of the group decision making problem. Indeed, over the past few years, static consensus models have given way to new dynamic approaches in order to manage parameter variability or to adapt to environment changes. This paper presents a systematic literature review on the recent evolution of consensus reaching models under dynamic environments and critically analyse their advantages and limitations.

Keywords: Group decision making; dynamic decision support systems; consensus process; multi period decision making; adaptive consensus models.

1. Introduction

Group Decision Making (GDM) is usually described as a best alternative(s) selection process of selection from a given set of feasible options based on the opinions of a group of people, frequently referred to as experts. This process is of importance not only when the decision consequences affect a group of people, but also when the decision itself can be improved, that is to make better decisions, by involving more people in the decision process [5, 9, 30].

Ideally, unanimous decisions, i.e. total agreement on the decision by all experts, are aimed at, although it is not really necessary. Indeed, the majority rule is frequently presented as a cornerstone of any democratic decision [6, 12]. Nevertheless, different situations may require

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