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Comparison between CRP and SCHLUMBERGER arrays

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ABSTRACT: In this research work, Plug in Hybrid Electric Vehicle (PHEV) is studied how to participate in the energy market, reactive power market and coupled energy and reactive power market. The PHEV capability curve is identified which have been recently presented in the related work in the area. The concept Lost Opportunity Cost (LOC) is explained based on the capability of PHEV and its application is fully taken into consideration. Then PHEV is included in energy, reactive and coupled market. This require to determine objective functions in each market. Finally a 17-node microgrid is taken as case study in which some of PHEVs are placed to take part in these markets.

***Keywords*:** energy market, reactive power market, coupled energy and reactive power market, Plug in Hybrid Electric Vehicle (PHEV), Expected Payment Function (EPF), Total Payment Function (TPF), Lost Opportunity Cost (LOC).

INTRODUCTION

The purpose of this paper is to give a brief taxonomy of an important group of programming problems which occur in certain branches of applied mathematics. A rough heading for these problems is “Modeling of Mathematical Programming Problem”. Here special emphasis is given on multi-objective optimization problem. It is no accident that the principal source of such problems is multiple decision-making in which the action space is of a multi-objective nature. Iterative approaches involving interactions with decision makers have often been advocated in multiple criterion optimizations as well as in the specification of politician’s preferences in macro-economic decisions involving multiple objectives.

Traditional mathematical programming models are based on the assumption that the decision making has a single, quantifiable, objective such as maximization of profit or minimization of inefficiency or cost. However, often there are situations, where instead of posing a single objective, managers use comparative criteria in decision-making. Thus, instead of setting only one objective, multiple goals in form of linear may be set. Specification of multiple goals creates difficulties in the solution to a given problem because the objectives are usually conflicting and incommensurate.

Many researchers have proposed algorithms for solving mathematical programming problem, for example: Charnes and Cooper (1962), Martos (1975), Wolf(1985) and others. Comparative investigations of such algorithms can be found in Arsham and Kahn (1990) and Bhatt (1989). Additional information concerning especially the ‘bad points (A point x^l is called a bad point if $f(x)$ tending to infinity when x tending to x^l) is studied by Verma, Khanna and Puri (1989).

For the first time an elimination algorithm is modeled for numerical solution of multi-objective linear programming problem by using Williams (1986), Kanniappan and Thangavel (1998), Jain (2009) work’s in modified form for MOLPP by using Fourier method. Our aim is to reduce the computing time of the optimization process of the proposed problem in which multi-objective function treated as constraints in nature. These constraints are encountered in transportation, flow and network models. It is assumed that the set of the feasible solutions is a convex polyhedral with a finite number of extreme points and that the denominator of the quotient function is non-zero on the constraint set.

MATERIALS AND METHODS

Pregelled starch having 11.2 % moisture content, 0.07 ash content, 26% amylase and 74 % amylopectin was kindly supplied by Cairo Company for Starch and Glucose, Cairo, Egypt. Methacrylamide was procured from E. Merck, Germany. Analar grade of ethyl and methyl alcohols and hydroquinone were purchased from S.D. Fine Chemicals, Mumbai, India. All the chemicals used were of analytical grade.

Microwave initiated synthesis of poly (MAam)-pregelled starch graft copolymer:

Unless otherwise indicated, pregelled starch (2 gm) was dissolved in 100 ml of double distilled water. Accurate amounts of methacrylamide (0.5 - 5.0 g) were dissolved in 20 ml water and were added to the pregelled starch solution, i.e. the total volume of water was 120 ml. They were mixed well using magnetic stirrer and transferred to the glass conical flask (250 ml). The flask was then placed on the disc spinner of the microwave oven (CE 1111L, Samsung Electronics, India) and microwave irradiated at different values (150 - 600) and various durations (15–180 S) in order to get the optimized irradiation power and duration. At the end of the reaction (i.e. formation of gel mass), the flasks were placed in ice cooled water. The flasks were kept undistributed for 24 hr to complete the grafting reaction.

RESULTS AND DISCUSSION

Propagation:

In presence of synthetic vinyl monomer, pregelled starch radical is added to the double bond of the vinyl monomer, resulting in a covalent bond between monomer and pregelled starch with creation of a free radical on the monomer, i.e., a chain is initiated. Subsequent addition of monomer molecules to the initiated chain propagates the grafting reaction onto pregelled starch as follows:

Termination:

Finally, termination of the growing grafted chain may occur via reaction with the initiator, coupling or combination and disproportionation as follows:

Effect of methacrylamide concentration:

Figureure 2 declares the effect of changing MAam concentration on the percent graft yield of poly (MAam) - pregelled starch graft copolymer using the optimum 120 S exposure time obtained above in section 3.1.1. Details of the conditions used are given in the text. It is clear from the drown data that there is a direct relation between the percent graft yield and monomer concentration within the experimental range studied, the higher the MAam concentration the greater availability of the latter in the vicinity of pregelled starch as well as the molecular collision of the reactants. Beside, the microwave radiation rotates the methacrylamide molecules, leading to elongation of its C-C double bond at which the pi bond electron cloud splits up into two localized clouds (i.e. free radical sites on the basic carbon atoms). Both the free radical sites that created on the pregelled starch backbone and that on the methacrylamide by microwave radiation interacts through common free radical reaction mechanism, to yield poly (methacrylamide) - pregelled starch graft copolymer.

Effect of microwave irradiation power:

Figureure 3 clarifies the effect of microwave irradiation power as one of the powerful controlling factors affect the percent graft yield of poly (MAam) - pregelled starch graft copolymer using 120 S exposure time and 4 g methacrylamide concentration. To optimize the microwave power, reaction was preceded from 150 to 600 W. It is clear that, the percent graft yield increases initially with increasing microwave power up to 500 W then decreases thereafter. This can be explained in the manner of, when the microwave radiation power increases up to 500 W, the rotation of the methacrylamide molecules increased, which leads to more and more elongation of its bond. As the C-C double bond elongates more, the pi bond electron cloud splits up into two localized clouds (i.e. free radical sites on the constituent carbon atoms). Both the free radical sites thus created on the pregelled starch backbone and that on the methacrylamide by microwave radiation interacts rapidly through usual free radical reaction mechanism, to yield higher graft yields of the prepared copolymer. Saying on other word, higher grafting may be account to the more availability of microwave energy at higher microwave power, which causes more and more monomer and macro radical generation. On the other hand, after 500 W microwave power, the decrease in percent graft yield may be attributed to more homopolymer formation at higher microwave powers or to some decomposition of the graft copolymer at higher microwave power.

CONCLUSION

The technique discussed in this paper provides an interactive approach in which the decision maker can search for an acceptable solution of the multi-objective optimization problem. The proposed method to solve multiobjective linear programming problem is better than many existing methods as the concept of bound is used in the iteration.

If we substitute some values to a_i , α_i in multi-objective linear programming problem (3.1), it reduces into single objective LPP. This discussion also holds in the case as given by by Kanniappan and Thangavel (1998). The same problem for integer solution was studied by Bhargava and Sharma (2003).

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