CHAPTER I

INTRODUCTION

The purpose of this study is to determine all solutions of

$$(*)\quad f(x + y) = g(x)f(y) + g(y)f(x)$$

on certain semigroups into a field. It turns out that certain classes of solutions of this equation can be expressed in terms of homomorphism from the semigroup into the multiplicative group of the field. Chapter II deals with background material needed for our work, including results concerning the determination of homomorphisms. Our main results are in chapter III and chapter IV. In chapter III, we obtain all the solutions of (*) on cyclic monoid. This result is used to find all continuous solution of(*) on $\mathbb{R}^+ \cup \{0\}$ in chapter IV.