INTRODUCTION

The screw extruder is applied on a wide range as a basic element in various industries. A great progress in the design of this element is achieved, in accordance with its growing importance in its applications [1,2]. The studies of the characteristics of different types of screw exteruders are mainly based on experimental results.[3,4,5]

The theoretical investigation concerning this field are limited, despite the remarcable technological development of the screw extruders. The studies of the flow patterns in the extruders are mainly based on the use of numerical methods[6,7]. However, various anothers[8,9] used the so called plate model to investigate the flow pattern in extruder.

The plate-model is used to approximate screw extruders of small channel depth relative to the radius of the warm. This model is realized by imagining the channel to be unrolled to a rectangular duct and the barrel to a flat plate sliding on it.

In the present thesis the flow pattern of a fluid of grade-three is studied in the plate model of a screw exteruder. The thesis is subdivided into four chapters. The first chapter is devoted to the study of the dynamical equations for non-linear fluids. The dynamics of flow and

the derivation of the successive equations of motion obtained by applying the perturbation technique to the boundary value problem under consideration, is presented in chapter two. The solution of the obtained system of successive boundary value problems, corresponding to the motions of fluids of grade-one, two, and three are calculated in chapter three. Finally, chapter four includes the results and discussions.