

## **Disease Transmission MSEIR Model with Individuals Traveling Between Patches $I$ and $I + 1$ .**

### **ABSTRACT**

In this article we want to formulate a disease transmission model, MSEIR model, for a population with individuals travelling between patches  $i$  and  $i + 1$  and we derive an explicit formula for the basic reproductive number,  $R_0$ , employing the spectral radius of the next generation operator. Also, in this article we show that a system of ordinary differential equations for this model has a unique disease-free equilibrium and it is locally asymptotically stable if  $R_0 < 1$  and unstable if  $R_0 > 1$ .

**Keyword :** Basic reproductive number, modified reproductive number, disease-free equilibrium, irreducible.