**7. Pseudo- Metric Function**

(7.1) **Definition**: If be a non-empty set. We said that a function be pseudo- metric function, if

1. .
2. .
3. .
4. .

(7.2) **Definition**: A function on be a metric, if .

(7.3) **Definition**: Pseudo- metric space is , such that is a non-empty set and is Pseudo- metric function on .

(7.4) **Theorem:** Let be Pseudo- metric function. We define a relation on as , then

1. be an equivalent relation on .
2. If be an equivalent class ofand , then defined by is a metric on , this means be a metric space.

**Proof:** (1) since is a reflexive.

Let , but is a symmetric.

Let , since , but is a transitive

is an equivalent relation on .

(7.5)**Example:** Let be a set of all real functions on , we define by , then be Pseudo- metric and does not metric on .

**Solution:** (1) let

.

(2) let , .

(3) let

.

(4) let

Pseudo- metric.

Let defined by

and

, but .

**Product Space**

(7.6) **Definition:** Let be Cartesian product of denoted by and defined by , its clear if, then .

(7.7) **Example:** If be a metric spaces, then be a metric space, such that max .

**Solution:** (1) let max .

(2) let

max .

(3) let

max max .

(4) let

max max max max .

**Euclidean Spaces**

(7.8) **Definition:** Let , a finite sequence consists of real numbers called -tuples. We said a set which its elements of components is Euclidean -tuples and denoted by

.

(7.9) **Example:** Let a function defined by

, then be a metric function on .

**Solution:** (1) let

.

(2) .

(3) let

.

(4)

Put and

is a metric function on .

(7.10) **Example:** Let a function defined by

, then be a metric function on .

**Solution:** (1), (2), (3) are clear.

(4) let

Put and

Since

is a metric function on .