assignment 1.md 2024-07-30

(4)

Let  $S=\mathbb{R} imes\mathbb{R}$  . Define a relation R on S as follows: R=(a,b),(c,d)|a+b=c+d .

(a) prove  ${\cal R}$  is an equivalence relation

$$orall (a,b) \in S, a+b=a+b \ \ ext{so } R ext{ is reflexive}.$$

$$\forall (a,b) \in S, a+b=c+d \implies c+d=a+b$$
 so  $R$  is symmetric.

$$orall ((a,b),(c,d),(e,f)) \in S, a+b=c+d, c+d=e+f \implies a+b=e+f \quad ext{ so } R ext{ is transitive}.$$

Since R is reflexive, symmetric and transitive, R is an equivalence relation.