

1. Let $p_{i,j}, p_n$, and p be real numbers for all i, j, n . Suppose

$$p_{1,j} \rightarrow p_1$$

$$p_{2,j} \rightarrow p_2$$

... and in general

$$p_{i,j} \rightarrow p_i$$

as $j \rightarrow \infty$. Further assume

$$p_n \rightarrow p$$

Prove or disprove that $\{p_{j,j}\}$ converges.

2. Let $a_{i,j}, a_n$, and a be positive real numbers for all i, j, n . Suppose

$$\sum_{j=1}^{\infty} a_{1,j} = a_1$$

$$\sum_{j=1}^{\infty} a_{2,j} = a_2$$

and in general

$$\sum_{j=1}^{\infty} a_{i,j} = a_i$$

Further assume

$$\sum_{j=1}^{\infty} a_j = a$$

Prove or disprove

$$\sum_{j=1}^{\infty} a_{j,j}$$

converges.