

**Lemma.** The solution of ?? is monotonic in  $\mathbf{V}$  and  $\mathbf{W}$ , i.e.,  $\langle \mathbf{V}, \mathbf{W} \rangle \preceq \langle \mathbf{V}', \mathbf{W}' \rangle \Rightarrow \Sigma(\mathbf{V}, \mathbf{W}) \leq \Sigma(\mathbf{V}', \mathbf{W}')$ .