

We consider the additive semigroup $\mathcal{O}_K^+(+)$ of totally positive integers in a real quadratic field $K = \mathbb{Q}(\sqrt{D})$. We define on $\mathcal{O}_K^+(+)$ the partition function $p_K(\alpha)$ and develop an algorithm for computing $p_K(\alpha)$ for different square-free D and different $\alpha \in \mathcal{O}_K^+$. We then investigate the behaviour of $p_K(\alpha)$, characterizing the square-free numbers D for which $p_K(\alpha)$ attains the numbers 1 through 5. Finally, we prove a sufficient condition for the number 6 to be attainable by $p_K(\alpha)$.