Problem  (20 points) The surface $M$ is parametrized as follows:

$$
\begin{align*}
  x &= u + v \\
  y &= u - v \\
  z &= u^2 - v^2
\end{align*}
$$

and $(u, v) \in D$, where $D$ is the unit disk $\{(u, v) \in \mathbb{R}^2 \mid u^2 + v^2 \leq 1\}$. Find the area of $M$. 