Let $G$ be a connected semisimple linear algebraic group defined over an algebraically closed field $k$ and $P \subset G$, $P \neq G$, a reduced parabolic subgroup that does not contain any simple factor of $G$. Let $\rho: P \rightarrow H$ be a homomorphism, where $H$ is a connected reductive linear algebraic group defined over $k$, with the property that the image $\rho(P)$ is not contained in any proper parabolic subgroup of $H$. We prove that the principal $H$-bundle $G \times^P H$ over $G/P$ constructed using $\rho$ is stable with respect to any polarization on $G/P$. When the characteristic of $k$ is positive, the principal $H$-bundle $G \times^P H$ is shown to be strongly stable with respect to any polarization on $G/P$.

**Keywords:** Homogeneous space, principal bundle, Frobenius, stability.

**MSC:** 14M15, 14F05