$$\left|\begin{matrix}2&-1&1\\-1&2&-1\\λ+1&λ-1&λ\end{matrix}\right|=2\left|\begin{matrix}2&-1\\λ-1&λ\end{matrix}\right|+1\left|\begin{matrix}-1&-1\\λ+1&λ\end{matrix}\right|+1\left|\begin{matrix}-1&2\\λ+1&λ-1\end{matrix}\right|= $$

$$=2\left(2λ-\left(-1\right)\left(λ-1\right)\right)+\left(-λ-\left(-1\right)\left(λ+1\right)\right)+(-1\left(λ-1\right)-2\left(λ+1\right)=$$

$$=4λ+λ-1-λ+λ+1-λ+1+2λ-2=2λ-1 $$