**\chapter\*{Anexo I}**

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La Descomposición en Valores Singulares (DVS) de una matriz $\boldsymbol{X}$ de dimensión $n \times p$ tiene la forma

\begin{equation\*}

\**label{DVS\_X}**

\boldsymbol{X}=\boldsymbol{U}\boldsymbol{D}\boldsymbol{V}^T,

\end{equation\*}

donde $\boldsymbol{U}$ es una matriz de dimensión $n \times p$ cuyas columnas son ortonormales, $\boldsymbol{V}$ es una matriz ortogonal de dimensión $p \times p$ y $\boldsymbol{D}$ es una matriz diagonal de dimensión $p \times p$ que contiene los valores singulares de $\boldsymbol{X}$. La matriz $\boldsymbol{U}$ verifica $\boldsymbol{U}^T\boldsymbol{U}=\boldsymbol{I}$ y sus columnas, además de generar el espacio de las columnas de $\boldsymbol{X}$, son un conjunto de autovectores de $\boldsymbol{X}\boldsymbol{X}^T$. La matriz $\boldsymbol{V}$ verifica $\boldsymbol{V}^T\boldsymbol{V}=\boldsymbol{V}\boldsymbol{V}^T=\boldsymbol{I}$ y sus columnas, además de generar el espacio de las filas de $\boldsymbol{X}$, son un conjunto de autovectores de $\boldsymbol{X}^T\boldsymbol{X}$. Los valores singulares distintos de cero de la matriz $\boldsymbol{X}$ son la raíz cuadrada de los autovalores de $\boldsymbol{X}\boldsymbol{X}^T$ y $\boldsymbol{X}^T\boldsymbol{X}$.

**\chapter\*{Anexo II}**

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Caso $p=100$.

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**\chapter\*{Anexo III}**

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