

# Clasificación\_Redes\_MCG

November 22, 2025

## 1 4. Redes con Tensorflow-Pytorch

Hacer el problema de clasificación del punto 1, usando:

- Tensorflow
- Pytorch

En cada uno, evalúe el modelo. ¿Se obtuvieron mejores resultados en comparación con los modelos clásicos?

### 1.1 \*\* Carga de los datos desde kaggle - Loan\_approval\_data\_2025\*\* *italicized text*

```
[1]: import kagglehub  
import os  
import pandas as pd
```

```
[2]: path = kagglehub.dataset_download("parthpatel2130/  
    ↪realistic-loan-approval-dataset-us-and-canada")  
print(path)
```

Using Colab cache for faster access to the 'realistic-loan-approval-dataset-us-and-canada' dataset.

/kaggle/input/realistic-loan-approval-dataset-us-and-canada

```
[3]: for f in os.listdir(path):  
    print(f)
```

Loan\_approval\_data\_2025.csv

```
[4]: df_loan = pd.read_csv(path + "/Loan_approval_data_2025.csv")  
df_loan.head()
```

```
[4]: customer_id  age occupation_status  years_employed  annual_income  \  
0  CUST100000  40      Employed        17.2          25579  
1  CUST100001  33      Employed        7.3           43087  
2  CUST100002  42      Student         1.1           20840  
3  CUST100003  53      Student         0.5           29147  
4  CUST100004  32      Employed        12.5          63657
```

	credit_score	credit_history_years	savings_assets	current_debt	\
0	692	5.3	895	10820	
1	627	3.5	169	16550	
2	689	8.4	17	7852	
3	692	9.8	1480	11603	
4	630	7.2	209	12424	

  

	defaults_on_file	delinquencies_last_2yrs	derogatory_marks	product_type	\
0	0	0	0	Credit Card	
1	0	1	0	Personal Loan	
2	0	0	0	Credit Card	
3	0	1	0	Credit Card	
4	0	0	0	Personal Loan	

  

	loan_intent	loan_amount	interest_rate	debt_to_income_ratio	\
0	Business	600	17.02	0.423	
1	Home Improvement	53300	14.10	0.384	
2	Debt Consolidation	2100	18.33	0.377	
3	Business	2900	18.74	0.398	
4	Education	99600	13.92	0.195	

  

	loan_to_income_ratio	payment_to_income_ratio	loan_status	
0	0.023	0.008	1	
1	1.237	0.412	0	
2	0.101	0.034	1	
3	0.099	0.033	1	
4	1.565	0.522	1	

## 1.2 Carga de librerias necesarias

```
[5]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.model_selection import train_test_split, GridSearchCV
from sklearn.metrics import (
    classification_report,
    confusion_matrix,
    roc_curve,
    auc,
    accuracy_score,
    f1_score,
    mean_squared_error,
    r2_score,
)
```

```

from sklearn.preprocessing import StandardScaler, OneHotEncoder
from sklearn.compose import ColumnTransformer
from sklearn.pipeline import Pipeline

from sklearn.linear_model import LogisticRegression
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier, GradientBoostingClassifier
# Métodos de Ensamble
from sklearn.svm import SVC, LinearSVC
from sklearn.naive_bayes import GaussianNB


import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

import torch
import torch.nn as nn
import torch.optim as optim
from torch.utils.data import TensorDataset, DataLoader

```

### 1.3 División de datos

Antes de entrenar los modelos de Redes Neuronales, es muy importante que los datos estén en el formato numérico y de tensor esperado. Utilizamos el preprocesador definido en la sección de Modelos Clásicos para aplicar el escalado y la codificación One-Hot a las variables categóricas, asegurando que no queden columnas de tipo objeto

```
[6]: df_loan_final = df_loan.drop(columns=['customer_id'])
```

```
[7]: objetivo = 'loan_status'
lista_resultados = []

try:
    X = df_loan_final.drop(objetivo, axis=1)
    y = df_loan_final[objetivo]
except KeyError:
    print(f"Error: No se encontró la columna '{objetivo}' en datos_p1.")

X_train, X_test, y_train, y_test = train_test_split(X, y,
                                                    test_size=0.3,
                                                    random_state=42,
                                                    stratify=y)
```

```
[8]: variables_num = X_train.select_dtypes(include=np.number).columns.tolist()
variables_cat = X_train.select_dtypes(include='object').columns.tolist()

preprocesador = ColumnTransformer(
    transformers=[
        ('num', StandardScaler(), variables_num),
        ('cat', OneHotEncoder(handle_unknown='ignore', sparse_output=False), ↴variables_cat)
    ],
    remainder='passthrough'
)

X_train_transformado = preprocesador.fit_transform(X_train)
X_test_transformado = preprocesador.transform(X_test)

nombres_transformados = (
    variables_num +
    list(preprocesador.named_transformers_['cat']. ↴get_feature_names_out(variables_cat))
)

df_transformado = pd.DataFrame(
    X_train_transformado,
    columns=nombres_transformados
)
```

## 1.4 Implementación TensorFlow

Observamos que después de la transformación, la dimensión de entrada ha pasado de las variables originales a 27 características input\_dim=27 un valor clave que usaremos para definir la primera capa de ambas redes.

```
[9]: X_train_final = preprocesador.transform(X_train)
X_test_final = preprocesador.transform(X_test)

input_dim = X_train_final.shape[1]
print(f"La dimensión de entrada correcta es: {input_dim}")

num_clases = 1

model_tf = Sequential([
    # Se corrige input_shape a la nueva dimensión (27)
    Dense(64, activation='relu', input_shape=(input_dim,)),
    Dense(32, activation='relu'),
    Dense(num_clases, activation='sigmoid')
])
```

```

model_tf.compile(
    optimizer='adam',
    loss='binary_crossentropy',
    metrics=['accuracy']
)

print(model_tf.summary())

```

La dimensión de entrada correcta es: 27

```

/usr/local/lib/python3.12/dist-packages/keras/src/layers/core/dense.py:93:
UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When
using Sequential models, prefer using an `Input(shape)` object as the first
layer in the model instead.
    super().__init__(activity_regularizer=activity_regularizer, **kwargs)
Model: "sequential"

```

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 64)	1,792
dense_1 (Dense)	(None, 32)	2,080
dense_2 (Dense)	(None, 1)	33

Total params: 3,905 (15.25 KB)

Trainable params: 3,905 (15.25 KB)

Non-trainable params: 0 (0.00 B)

None

```
[10]: history = model_tf.fit(
    X_train_final,
    y_train,
    epochs=50,
    batch_size=32,
    validation_data=(X_test_final, y_test),
    verbose=1
)
```

Epoch 1/50  
1094/1094 5s 3ms/step -  
accuracy: 0.8563 - loss: 0.3233 - val\_accuracy: 0.9029 - val\_loss: 0.2190  
Epoch 2/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9022 - loss: 0.2189 - val\_accuracy: 0.9068 - val\_loss: 0.2108  
Epoch 3/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9088 - loss: 0.2065 - val\_accuracy: 0.9032 - val\_loss: 0.2139  
Epoch 4/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9060 - loss: 0.2079 - val\_accuracy: 0.9098 - val\_loss: 0.2054  
Epoch 5/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9136 - loss: 0.1955 - val\_accuracy: 0.9083 - val\_loss: 0.2058  
Epoch 6/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9120 - loss: 0.1971 - val\_accuracy: 0.9129 - val\_loss: 0.2004  
Epoch 7/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9132 - loss: 0.1937 - val\_accuracy: 0.9126 - val\_loss: 0.2017  
Epoch 8/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9135 - loss: 0.1918 - val\_accuracy: 0.9110 - val\_loss: 0.2044  
Epoch 9/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9145 - loss: 0.1928 - val\_accuracy: 0.9133 - val\_loss: 0.1989  
Epoch 10/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9145 - loss: 0.1914 - val\_accuracy: 0.9120 - val\_loss: 0.2004  
Epoch 11/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9155 - loss: 0.1863 - val\_accuracy: 0.9131 - val\_loss: 0.2010  
Epoch 12/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9188 - loss: 0.1834 - val\_accuracy: 0.9088 - val\_loss: 0.2031  
Epoch 13/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9178 - loss: 0.1804 - val\_accuracy: 0.9107 - val\_loss: 0.2022  
Epoch 14/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9158 - loss: 0.1856 - val\_accuracy: 0.9129 - val\_loss: 0.1984  
Epoch 15/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9237 - loss: 0.1758 - val\_accuracy: 0.9135 - val\_loss: 0.1992  
Epoch 16/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9215 - loss: 0.1769 - val\_accuracy: 0.9092 - val\_loss: 0.2053

Epoch 17/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9225 - loss: 0.1738 - val\_accuracy: 0.9136 - val\_loss: 0.1973  
Epoch 18/50  
1094/1094            4s 3ms/step -  
accuracy: 0.9225 - loss: 0.1759 - val\_accuracy: 0.9131 - val\_loss: 0.1994  
Epoch 19/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9229 - loss: 0.1736 - val\_accuracy: 0.9141 - val\_loss: 0.1990  
Epoch 20/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9253 - loss: 0.1728 - val\_accuracy: 0.9130 - val\_loss: 0.1981  
Epoch 21/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9252 - loss: 0.1697 - val\_accuracy: 0.9084 - val\_loss: 0.2086  
Epoch 22/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9259 - loss: 0.1680 - val\_accuracy: 0.9107 - val\_loss: 0.2025  
Epoch 23/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9226 - loss: 0.1733 - val\_accuracy: 0.9151 - val\_loss: 0.1962  
Epoch 24/50  
1094/1094            3s 2ms/step -  
accuracy: 0.9265 - loss: 0.1665 - val\_accuracy: 0.9130 - val\_loss: 0.2026  
Epoch 25/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9264 - loss: 0.1651 - val\_accuracy: 0.9128 - val\_loss: 0.1980  
Epoch 26/50  
1094/1094            5s 3ms/step -  
accuracy: 0.9292 - loss: 0.1628 - val\_accuracy: 0.9092 - val\_loss: 0.2093  
Epoch 27/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9260 - loss: 0.1683 - val\_accuracy: 0.9111 - val\_loss: 0.2023  
Epoch 28/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9300 - loss: 0.1629 - val\_accuracy: 0.9135 - val\_loss: 0.2009  
Epoch 29/50  
1094/1094            4s 3ms/step -  
accuracy: 0.9275 - loss: 0.1660 - val\_accuracy: 0.9131 - val\_loss: 0.2001  
Epoch 30/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9287 - loss: 0.1612 - val\_accuracy: 0.9113 - val\_loss: 0.2034  
Epoch 31/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9327 - loss: 0.1570 - val\_accuracy: 0.9126 - val\_loss: 0.2014  
Epoch 32/50  
1094/1094            3s 3ms/step -  
accuracy: 0.9311 - loss: 0.1594 - val\_accuracy: 0.9127 - val\_loss: 0.2033

Epoch 33/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9307 - loss: 0.1579 - val\_accuracy: 0.9143 - val\_loss: 0.2002  
Epoch 34/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9261 - loss: 0.1643 - val\_accuracy: 0.9147 - val\_loss: 0.2019  
Epoch 35/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9309 - loss: 0.1586 - val\_accuracy: 0.9113 - val\_loss: 0.2076  
Epoch 36/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9268 - loss: 0.1615 - val\_accuracy: 0.9128 - val\_loss: 0.2042  
Epoch 37/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9305 - loss: 0.1574 - val\_accuracy: 0.9119 - val\_loss: 0.2030  
Epoch 38/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9326 - loss: 0.1544 - val\_accuracy: 0.9117 - val\_loss: 0.2055  
Epoch 39/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9306 - loss: 0.1590 - val\_accuracy: 0.9083 - val\_loss: 0.2130  
Epoch 40/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9290 - loss: 0.1572 - val\_accuracy: 0.9130 - val\_loss: 0.2044  
Epoch 41/50  
1094/1094 6s 3ms/step -  
accuracy: 0.9322 - loss: 0.1536 - val\_accuracy: 0.9098 - val\_loss: 0.2057  
Epoch 42/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9332 - loss: 0.1528 - val\_accuracy: 0.9114 - val\_loss: 0.2076  
Epoch 43/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9342 - loss: 0.1535 - val\_accuracy: 0.9100 - val\_loss: 0.2104  
Epoch 44/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9322 - loss: 0.1552 - val\_accuracy: 0.9109 - val\_loss: 0.2072  
Epoch 45/50  
1094/1094 4s 3ms/step -  
accuracy: 0.9315 - loss: 0.1560 - val\_accuracy: 0.9101 - val\_loss: 0.2183  
Epoch 46/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9328 - loss: 0.1521 - val\_accuracy: 0.9091 - val\_loss: 0.2171  
Epoch 47/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9320 - loss: 0.1526 - val\_accuracy: 0.9117 - val\_loss: 0.2089  
Epoch 48/50  
1094/1094 3s 3ms/step -  
accuracy: 0.9328 - loss: 0.1548 - val\_accuracy: 0.9089 - val\_loss: 0.2171

```

Epoch 49/50
1094/1094          4s 4ms/step -
accuracy: 0.9332 - loss: 0.1503 - val_accuracy: 0.9099 - val_loss: 0.2104
Epoch 50/50
1094/1094          3s 3ms/step -
accuracy: 0.9354 - loss: 0.1454 - val_accuracy: 0.9107 - val_loss: 0.2133

```

```

[25]: datos_inventados_nuevos = {
    'age': [20, 45],
    'occupation_status': ['Unemployed', 'Employed'],
    'years_employed': [0.0, 20.0],
    'annual_income': [10000, 150000],
    'credit_score': [650, 800],
    'credit_history_years': [0.5, 25.0],
    'savings_assets': [500, 50000],
    'current_debt': [0, 10000],
    'defaults_on_file': [0, 0],
    'delinquencies_last_2yrs': [0, 0],
    'derogatory_marks': [0, 0],
    'product_type': ['Credit Card', 'Line of Credit'],
    'loan_intent': ['Personal', 'Business'],
    'loan_amount': [500, 100000],
    'interest_rate': [18.0, 6.5],
    'debt_to_income_ratio': [0.0, 0.067],
    'loan_to_income_ratio': [0.05, 0.67],
    'payment_to_income_ratio': [0.05, 0.04]
}

X_nuevos_a_predecir = pd.DataFrame(datos_inventados_nuevos)

print("DataFrame 'X_nuevos_a_predecir' creado exitosamente.")

```

DataFrame 'X\_nuevos\_a\_predecir' creado exitosamente.

```

[26]: print("Evaluación del Modelo Keras")

loss, accuracy = model_tf.evaluate(X_test_final, y_test, verbose=0)
print(f"Pérdida (Binary Cross-entropy) en prueba: {loss:.4f}")
print(f"Exactitud (Accuracy) en prueba: {accuracy:.4f}")

X_nuevos_final = procesador.transform(X_nuevos_a_predecir)

predicciones_keras_prob = model_tf.predict(X_nuevos_final)

clases_predichas_keras = (predicciones_keras_prob > 0.5).astype("int32").
    flatten()

```

```

print(f"Probabilidades de Aprobación (P(Y=1)):\n{predicciones_keras_prob.
    ↪flatten()}")
print(f"Clases Predichas (0=No Aprobado, 1=Aprobado):
    ↪\n{clases_predichas_keras}")

```

Evaluación del Modelo Keras  
 Pérdida (Binary Cross-entropy) en prueba: 0.2133  
 Exactitud (Accuracy) en prueba: 0.9107  
 1/1            0s 43ms/step  
 Probabilidades de Aprobación (P(Y=1)):  
 [0.9998812 0.9999285]  
 Clases Predichas (0=No Aprobado, 1=Aprobado):  
 [1 1]

## 1.5 Implementación con PyTorch

Para esta parte, tenemos que ejecutar el one hot encoder, ya que las variables para la predicción con pytorch deben estar escaladas

```

[15]: if hasattr(X_train_final, 'toarray'):
    X_train_np = X_train_final.toarray()
    X_test_np = X_test_final.toarray()
else:
    X_train_np = X_train_final
    X_test_np = X_test_final

X_train_tensor = torch.tensor(X_train_np, dtype=torch.float32)
y_train_tensor = torch.tensor(y_train.values, dtype=torch.float32).unsqueeze(1)
X_test_tensor = torch.tensor(X_test_np, dtype=torch.float32)
y_test_tensor = torch.tensor(y_test.values, dtype=torch.float32).unsqueeze(1)

train_data = TensorDataset(X_train_tensor, y_train_tensor)
test_data = TensorDataset(X_test_tensor, y_test_tensor) # Agregamos el dataset de prueba

train_loader = DataLoader(dataset=train_data, batch_size=32, shuffle=True)
test_loader = DataLoader(dataset=test_data, batch_size=32, shuffle=False)

```

Volvemos a verificar la dimensionalidad despues de codificar los datos y ver las variables categoricas, y creamos la clase clasificadores

```

[27]: class ClasificadorANN(nn.Module):
    def __init__(self, input_size):
        super(ClasificadorANN, self).__init__()
        self.layer_1 = nn.Linear(input_size, 64)
        self.relu = nn.ReLU()
        self.layer_2 = nn.Linear(64, 32)
        self.layer_out = nn.Linear(32, 1)

```

```

        self.sigmoid = nn.Sigmoid()

    def forward(self, x):
        x = self.layer_1(x)
        x = self.relu(x)
        x = self.layer_2(x)
        x = self.relu(x)
        x = self.layer_out(x)
        x = self.sigmoid(x)
        return x

input_dim = X_train_tensor.shape[1]
print(f"La dimensión de entrada correcta para PyTorch es: {input_dim}")

model_pt = ClasificadorANN(input_dim)
criterion = nn.BCELoss()
optimizer = torch.optim.Adam(model_pt.parameters(), lr=0.001)

```

La dimensión de entrada correcta para PyTorch es: 27

Despues, entrenaremos el modelo

```

[28]: num_epochs = 50
model_pt.train()

for epoch in range(num_epochs):
    for X_batch, y_batch in train_loader:
        # Resetear gradientes
        optimizer.zero_grad()

        # Forward pass
        y_pred = model_pt(X_batch)
        loss = criterion(y_pred, y_batch)

        # Backward pass y optimización
        loss.backward()
        optimizer.step()

    # Opcional: imprimir el progreso de la pérdida
    if (epoch + 1) % 10 == 0:
        print(f'Epoch [{epoch+1}/{num_epochs}], Loss: {loss.item():.4f}')

```

Epoch [10/50], Loss: 0.3566  
 Epoch [20/50], Loss: 0.0373  
 Epoch [30/50], Loss: 0.3096  
 Epoch [40/50], Loss: 0.0745  
 Epoch [50/50], Loss: 0.0410

```
[24]: X_nuevos_final = preprocesador.transform(X_nuevos_a_predecir)

if hasattr(X_nuevos_final, 'toarray'):
    X_nuevos_np = X_nuevos_final.toarray()
else:
    X_nuevos_np = X_nuevos_final

model_pt.eval()
with torch.no_grad():
    X_nuevos_tensor = torch.tensor(X_nuevos_np, dtype=torch.float32)
    y_prob_pt = model_pt(X_nuevos_tensor)
    clases_predichas_pt = (y_prob_pt > 0.5).int().flatten().numpy()

print(f"Probabilidades de Aprobación (P(Y=1)):\n{y_prob_pt.flatten().numpy()}")
print(f"Clases Predichas (0=No Aprobado, 1=Aprobado):\n{clases_predichas_pt}"
```

```
Probabilidades de Aprobación (P(Y=1)):
[0.9999974 1.        ]
Clases Predichas (0=No Aprobado, 1=Aprobado):
[1 1]
```

Podemos ver que el uso de herramientas de deep learning como lo son pytorch y tensorflow hace mas efectiva las predicciones clasificadorias para los problemas qu se vieron antes. Usando modelos de machine learning llegamos a que estos tenian 0.91 de efectividad, mientras que estos en algunos casos llegan al 0.99 o hasta 1. Entonces pese a que usen mas recursos, estos son muchos mas efectivos para hacer clasificaciones.

Se podria a futuro mirar con modelos de clasificación no binarias, para mirar como seria el comportamiento de esta.

```
[29]: from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
[ ]: !apt-get install texlive-xetex texlive-latex-extra texlive-fonts-recommended
      pandoc
```

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
pandoc is already the newest version (2.9.2.1-3ubuntu2).
pandoc set to manually installed.
The following additional packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libgs9 libgs9-common libidn12
  libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1 libruby3.0
  libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1 libzzip-0-13
```

```
lmodern poppler-data preview-latex-style rake ruby ruby-net-telnet
ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration t1utils
teckit tex-common tex-gyre texlive-base texlive-binaries texlive-latex-base
texlive-latex-recommended texlive-pictures texlive-plain-generic tipa
xfonts-encodings xfonts-utils
```

Suggested packages:

```
fonts-noto fonts-freefont-otf | fonts-freefont-ttf libavalon-framework-java
libcommons-logging-java-doc libexcalibur-logkit-java liblog4j1.2-java
poppler-utils ghostscript fonts-japanese-mincho | fonts-ipafont-mincho
fonts-japanese-gothic | fonts-ipafont-gothic fonts-aphic-ukai
fonts-aphic-uming fonts-nanum ri ruby-dev bundler debhelper gv
| postscript-viewer perl-tk xpdf | pdf-viewer xzdec
texlive-fonts-recommended-doc texlive-latex-base-doc python3-pygments
icc-profiles libfile-which-perl libspreadsheet-parseexcel-perl
texlive-latex-extra-doc texlive-latex-recommended-doc texlive-luatex
texlive-pstricks dot2tex prerex texlive-pictures-doc vprerex
default-jre-headless tipa-doc
```

The following NEW packages will be installed:

```
dvisvgm fonts-droid-fallback fonts-lato fonts-noto-mono
fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
libcommons-parent-java libfontbox-java libgs9 libgs9-common libidn12
libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1 libruby3.0
libsyntax2 libteckit0 libtexlua53 libtexluajit2 libwoff1 libzip-0-13
lmodern poppler-data preview-latex-style rake ruby ruby-net-telnet
ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration t1utils
teckit tex-common tex-gyre texlive-base texlive-binaries
texlive-fonts-recommended texlive-latex-base texlive-latex-extra
texlive-latex-recommended texlive-pictures texlive-plain-generic
texlive-xetex tipa xfonts-encodings xfonts-utils
```

0 upgraded, 53 newly installed, 0 to remove and 41 not upgraded.

Need to get 182 MB of archives.

After this operation, 571 MB of additional disk space will be used.

```
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-droid-fallback all
1:6.0.1r16-1.1build1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1
[2,696 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 poppler-data all
0.4.11-1 [2,171 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-common all 6.17
[33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-urw-base35 all
20200910-1 [6,367 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9-common
all 9.55.0~dfsg1-0ubuntu5.13 [753 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libidn12 amd64
1.38-4ubuntu1 [60.0 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 libijs-0.35 amd64
0.35-15build2 [16.5 kB]
```

Get:9 http://archive.ubuntu.com/ubuntu jammy/main amd64 libjbig2dec0 amd64  
0.19-3build2 [64.7 kB]  
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9 amd64  
9.55.0~dfsg1-0ubuntu5.13 [5,032 kB]  
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libkpathsea6  
amd64 2021.20210626.59705-1ubuntu0.2 [60.4 kB]  
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 libwoff1 amd64  
1.0.2-1build4 [45.2 kB]  
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 dvisvgm amd64  
2.13.1-1 [1,221 kB]  
Get:14 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-lmodern all  
2.004.5-6.1 [4,532 kB]  
Get:15 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-noto-mono all  
20201225-1build1 [397 kB]  
Get:16 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-texgyre all  
20180621-3.1 [10.2 MB]  
Get:17 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java  
all 18-1 [4,720 B]  
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-  
java all 43-1 [10.8 kB]  
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-logging-  
java all 1.2-2 [60.3 kB]  
Get:20 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libptexenc1  
amd64 2021.20210626.59705-1ubuntu0.2 [39.1 kB]  
Get:21 http://archive.ubuntu.com/ubuntu jammy/main amd64 rubygems-integration  
all 1.18 [5,336 B]  
Get:22 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby3.0 amd64  
3.0.2-7ubuntu2.11 [50.1 kB]  
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-rubygems  
all 3.3.5-2ubuntu1.2 [228 kB]  
Get:24 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby amd64 1:3.0~exp1  
[5,100 B]  
Get:25 http://archive.ubuntu.com/ubuntu jammy/main amd64 rake all 13.0.6-2 [61.7  
kB]  
Get:26 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-net-telnet all  
0.1.1-2 [12.6 kB]  
Get:27 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-webrick  
all 1.7.0-3ubuntu0.2 [52.5 kB]  
Get:28 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-xmlrpc all  
0.3.2-1ubuntu0.1 [24.9 kB]  
Get:29 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libruby3.0  
amd64 3.0.2-7ubuntu2.11 [5,114 kB]  
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsynctex2  
amd64 2021.20210626.59705-1ubuntu0.2 [55.6 kB]  
Get:31 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libteckit0 amd64  
2.5.11+ds1-1 [421 kB]  
Get:32 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexlua53  
amd64 2021.20210626.59705-1ubuntu0.2 [120 kB]

```
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexluajit2
amd64 2021.20210626.59705-1ubuntu0.2 [267 kB]
Get:34 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libzzip-0-13 amd64
0.13.72+dfsg.1-1.1 [27.0 kB]
Get:35 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-encodings all
1:1.0.5-0ubuntu2 [578 kB]
Get:36 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-utils amd64
1:7.7+6build2 [94.6 kB]
Get:37 http://archive.ubuntu.com/ubuntu jammy/universe amd64 lmodern all
2.004.5-6.1 [9,471 kB]
Get:38 http://archive.ubuntu.com/ubuntu jammy/universe amd64 preview-latex-style
all 12.2-1ubuntu1 [185 kB]
Get:39 http://archive.ubuntu.com/ubuntu jammy/main amd64 t1utils amd64
1.41-4build2 [61.3 kB]
Get:40 http://archive.ubuntu.com/ubuntu jammy/universe amd64 teckit amd64
2.5.11+ds1-1 [699 kB]
Get:41 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-gyre all
20180621-3.1 [6,209 kB]
Get:42 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 texlive-
 binaries amd64 2021.20210626.59705-1ubuntu0.2 [9,860 kB]
Get:43 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-base all
2021.20220204-1 [21.0 MB]
Get:44 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-fonts-
 recommended all 2021.20220204-1 [4,972 kB]
Get:45 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-base
all 2021.20220204-1 [1,128 kB]
Get:46 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libfontbox-java all
1:1.8.16-2 [207 kB]
Get:47 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libpdfbox-java all
1:1.8.16-2 [5,199 kB]
Get:48 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-
 recommended all 2021.20220204-1 [14.4 MB]
Get:49 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-pictures
all 2021.20220204-1 [8,720 kB]
Get:50 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-extra
all 2021.20220204-1 [13.9 MB]
Get:51 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-plain-
 generic all 2021.20220204-1 [27.5 MB]
Get:52 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tipa all 2:1.3-21
[2,967 kB]
Get:53 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-xetex all
2021.20220204-1 [12.4 MB]
Fetched 182 MB in 3s (65.1 MB/s)
Extracting templates from packages: 100%
Preconfiguring packages ...
Selecting previously unselected package fonts-droid-fallback.
(Reading database ... 121713 files and directories currently installed.)
Preparing to unpack .../00-fonts-droid-fallback_1%3a6.0.1r16-1.1build1_all.deb
```

```
...
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1build1) ...
Selecting previously unselected package fonts-lato.
Preparing to unpack .../01-fonts-lato_2.0-2.1_all.deb ...
Unpacking fonts-lato (2.0-2.1) ...
Selecting previously unselected package poppler-data.
Preparing to unpack .../02-poppler-data_0.4.11-1_all.deb ...
Unpacking poppler-data (0.4.11-1) ...
Selecting previously unselected package tex-common.
Preparing to unpack .../03-tex-common_6.17_all.deb ...
Unpacking tex-common (6.17) ...
Selecting previously unselected package fonts-urw-base35.
Preparing to unpack .../04-fonts-urw-base35_20200910-1_all.deb ...
Unpacking fonts-urw-base35 (20200910-1) ...
Selecting previously unselected package libgs9-common.
Preparing to unpack .../05-libgs9-common_9.55.0~dfsg1-0ubuntu5.13_all.deb ...
Unpacking libgs9-common (9.55.0~dfsg1-0ubuntu5.13) ...
Selecting previously unselected package libidn12:amd64.
Preparing to unpack .../06-libidn12_1.38-4ubuntu1_amd64.deb ...
Unpacking libidn12:amd64 (1.38-4ubuntu1) ...
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack .../07-libijs-0.35_0.35-15build2_amd64.deb ...
Unpacking libijs-0.35:amd64 (0.35-15build2) ...
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack .../08-libjbig2dec0_0.19-3build2_amd64.deb ...
Unpacking libjbig2dec0:amd64 (0.19-3build2) ...
Selecting previously unselected package libgs9:amd64.
Preparing to unpack .../09-libgs9_9.55.0~dfsg1-0ubuntu5.13_amd64.deb ...
Unpacking libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.13) ...
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack .../10-libkpathsea6_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libwoff1:amd64.
Preparing to unpack .../11-libwoff1_1.0.2-1build4_amd64.deb ...
Unpacking libwoff1:amd64 (1.0.2-1build4) ...
Selecting previously unselected package dvisvgm.
Preparing to unpack .../12-dvisvgm_2.13.1-1_amd64.deb ...
Unpacking dvisvgm (2.13.1-1) ...
Selecting previously unselected package fonts-lmodern.
Preparing to unpack .../13-fonts-lmodern_2.004.5-6.1_all.deb ...
Unpacking fonts-lmodern (2.004.5-6.1) ...
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack .../14-fonts-noto-mono_20201225-1build1_all.deb ...
Unpacking fonts-noto-mono (20201225-1build1) ...
Selecting previously unselected package fonts-texgyre.
Preparing to unpack .../15-fonts-texgyre_20180621-3.1_all.deb ...
Unpacking fonts-texgyre (20180621-3.1) ...
```

```
Selecting previously unselected package libapache-pom-java.
Preparing to unpack .../16-libapache-pom-java_18-1_all.deb ...
Unpacking libapache-pom-java (18-1) ...
Selecting previously unselected package libcommons-parent-java.
Preparing to unpack .../17-libcommons-parent-java_43-1_all.deb ...
Unpacking libcommons-parent-java (43-1) ...
Selecting previously unselected package libcommons-logging-java.
Preparing to unpack .../18-libcommons-logging-java_1.2-2_all.deb ...
Unpacking libcommons-logging-java (1.2-2) ...
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack .../19-libptexenc1_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package rubygems-integration.
Preparing to unpack .../20-rubygems-integration_1.18_all.deb ...
Unpacking rubygems-integration (1.18) ...
Selecting previously unselected package ruby3.0.
Preparing to unpack .../21-ruby3.0_3.0.2-7ubuntu2.11_amd64.deb ...
Unpacking ruby3.0 (3.0.2-7ubuntu2.11) ...
Selecting previously unselected package ruby-rubygems.
Preparing to unpack .../22-ruby-rubygems_3.3.5-2ubuntu1.2_all.deb ...
Unpacking ruby-rubygems (3.3.5-2ubuntu1.2) ...
Selecting previously unselected package ruby.
Preparing to unpack .../23-ruby_1%3a3.0~exp1_amd64.deb ...
Unpacking ruby (1:3.0~exp1) ...
Selecting previously unselected package rake.
Preparing to unpack .../24-rake_13.0.6-2_all.deb ...
Unpacking rake (13.0.6-2) ...
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack .../25-ruby-net-telnet_0.1.1-2_all.deb ...
Unpacking ruby-net-telnet (0.1.1-2) ...
Selecting previously unselected package ruby-webrick.
Preparing to unpack .../26-ruby-webrick_1.7.0-3ubuntu0.2_all.deb ...
Unpacking ruby-webrick (1.7.0-3ubuntu0.2) ...
Selecting previously unselected package ruby-xmrlpc.
Preparing to unpack .../27-ruby-xmrlpc_0.3.2-1ubuntu0.1_all.deb ...
Unpacking ruby-xmrlpc (0.3.2-1ubuntu0.1) ...
Selecting previously unselected package libruby3.0:amd64.
Preparing to unpack .../28-libruby3.0_3.0.2-7ubuntu2.11_amd64.deb ...
Unpacking libruby3.0:amd64 (3.0.2-7ubuntu2.11) ...
Selecting previously unselected package libsynctex2:amd64.
Preparing to unpack .../29-libsynctex2_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libteckit0:amd64.
Preparing to unpack .../30-libteckit0_2.5.11+ds1-1_amd64.deb ...
Unpacking libteckit0:amd64 (2.5.11+ds1-1) ...
Selecting previously unselected package libtexlua53:amd64.
```

```
Preparing to unpack .../31-libtexlua53_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack .../32-libtexluajit2_2021.20210626.59705-1ubuntu0.2_amd64.deb ...
Unpacking libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libzip-0-13:amd64.
Preparing to unpack .../33-libzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb ...
Unpacking libzip-0-13:amd64 (0.13.72+dfsg.1-1.1) ...
Selecting previously unselected package xfonts-encodings.
Preparing to unpack .../34-xfonts-encodings_1%3a1.0.5-0ubuntu2_all.deb ...
Unpacking xfonts-encodings (1:1.0.5-0ubuntu2) ...
Selecting previously unselected package xfonts-utils.
Preparing to unpack .../35-xfonts-utils_1%3a7.7+6build2_amd64.deb ...
Unpacking xfonts-utils (1:7.7+6build2) ...
Selecting previously unselected package lmodern.
Preparing to unpack .../36-lmodern_2.004.5-6.1_all.deb ...
Unpacking lmodern (2.004.5-6.1) ...
Selecting previously unselected package preview-latex-style.
Preparing to unpack .../37-preview-latex-style_12.2-1ubuntu1_all.deb ...
Unpacking preview-latex-style (12.2-1ubuntu1) ...
Selecting previously unselected package t1utils.
Preparing to unpack .../38-t1utils_1.41-4build2_amd64.deb ...
Unpacking t1utils (1.41-4build2) ...
Selecting previously unselected package teckit.
Preparing to unpack .../39-teckit_2.5.11+ds1-1_amd64.deb ...
Unpacking teckit (2.5.11+ds1-1) ...
Selecting previously unselected package tex-gyre.
Preparing to unpack .../40-tex-gyre_20180621-3.1_all.deb ...
Unpacking tex-gyre (20180621-3.1) ...
Selecting previously unselected package texlive-binaries.
Preparing to unpack .../41-texlive-
binaries_2021.20210626.59705-1ubuntu0.2_amd64.deb ...
Unpacking texlive-binaries (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package texlive-base.
Preparing to unpack .../42-texlive-base_2021.20220204-1_all.deb ...
Unpacking texlive-base (2021.20220204-1) ...
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack .../43-texlive-fonts-recommended_2021.20220204-1_all.deb ...
Unpacking texlive-fonts-recommended (2021.20220204-1) ...
Selecting previously unselected package texlive-latex-base.
Preparing to unpack .../44-texlive-latex-base_2021.20220204-1_all.deb ...
Unpacking texlive-latex-base (2021.20220204-1) ...
Selecting previously unselected package libfontbox-java.
Preparing to unpack .../45-libfontbox-java_1%3a1.8.16-2_all.deb ...
Unpacking libfontbox-java (1:1.8.16-2) ...
Selecting previously unselected package libpdfbox-java.
```

```
Preparing to unpack .../46-libpdfbox-java_1%3a1.8.16-2_all.deb ...
Unpacking libpdfbox-java (1:1.8.16-2) ...
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack .../47-texlive-latex-recommended_2021.20220204-1_all.deb ...
Unpacking texlive-latex-recommended (2021.20220204-1) ...
Selecting previously unselected package texlive-pictures.
Preparing to unpack .../48-texlive-pictures_2021.20220204-1_all.deb ...
Unpacking texlive-pictures (2021.20220204-1) ...
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack .../49-texlive-latex-extra_2021.20220204-1_all.deb ...
Unpacking texlive-latex-extra (2021.20220204-1) ...
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack .../50-texlive-plain-generic_2021.20220204-1_all.deb ...
Unpacking texlive-plain-generic (2021.20220204-1) ...
Selecting previously unselected package tipa.
Preparing to unpack .../51-tipa_2%3a1.3-21_all.deb ...
Unpacking tipa (2:1.3-21) ...
Selecting previously unselected package texlive-xetex.
Preparing to unpack .../52-texlive-xetex_2021.20220204-1_all.deb ...
Unpacking texlive-xetex (2021.20220204-1) ...
Setting up fonts-lato (2.0-2.1) ...
Setting up fonts-noto-mono (20201225-1build1) ...
Setting up libwoff1:amd64 (1.0.2-1build4) ...
Setting up libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libijs-0.35:amd64 (0.35-15build2) ...
Setting up libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libfontbox-java (1:1.8.16-2) ...
Setting up rubygems-integration (1.18) ...
Setting up libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) ...
Setting up fonts-urw-base35 (20200910-1) ...
Setting up poppler-data (0.4.11-1) ...
Setting up tex-common (6.17) ...
update-language: texlive-base not installed and configured, doing nothing!
Setting up libjbig2dec0:amd64 (0.19-3build2) ...
Setting up libteckit0:amd64 (2.5.11+ds1-1) ...
Setting up libapache-pom-java (18-1) ...
Setting up ruby-net-telnet (0.1.1-2) ...
Setting up xfonts-encodings (1:1.0.5-0ubuntu2) ...
Setting up tiutils (1.41-4build2) ...
Setting up libidn12:amd64 (1.38-4ubuntu1) ...
Setting up fonts-texgyre (20180621-3.1) ...
Setting up libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up ruby-webrick (1.7.0-3ubuntu0.2) ...
Setting up fonts-lmodern (2.004.5-6.1) ...
Setting up fonts-droid-fallback (1:6.0.1r16-1.1build1) ...
Setting up ruby-xmlrpc (0.3.2-1ubuntu0.1) ...
Setting up libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libgs9-common (9.55.0~dfsg1-0ubuntu5.13) ...
```

```
Setting up teckit (2.5.11+ds1-1) ...
Setting up libpdfbox-java (1:1.8.16-2) ...
Setting up libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.13) ...
Setting up preview-latex-style (12.2-1ubuntu1) ...
Setting up libcommons-parent-java (43-1) ...
Setting up dvisvgm (2.13.1-1) ...
Setting up libcommons-logging-java (1.2-2) ...
Setting up xfonts-utils (1:7.7+6build2) ...
Setting up libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up texlive-binaries (2021.20210626.59705-1ubuntu0.2) ...
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up lmodern (2.004.5-6.1) ...
Setting up texlive-base (2021.20220204-1) ...
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST...
mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN...
mktexlsr: Updating /var/lib/texmf/ls-R...
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4: /var/lib/texmf/tex/generic/tex-
ini-files/pdftexconfig.tex
Setting up tex-gyre (20180621-3.1) ...
Setting up texlive-plain-generic (2021.20220204-1) ...
Setting up texlive-latex-base (2021.20220204-1) ...
Setting up texlive-latex-recommended (2021.20220204-1) ...
Setting up texlive-pictures (2021.20220204-1) ...
Setting up texlive-fonts-recommended (2021.20220204-1) ...
Setting up tipa (2:1.3-21) ...
Setting up texlive-latex-extra (2021.20220204-1) ...
Setting up texlive-xetex (2021.20220204-1) ...
Setting up rake (13.0.6-2) ...
Setting up libruby3.0:amd64 (3.0.2-7ubuntu2.11) ...
Setting up ruby3.0 (3.0.2-7ubuntu2.11) ...
Setting up ruby (1:3.0~exp1) ...
Setting up ruby-rubygems (3.3.5-2ubuntu1.2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
```

Processing triggers for libc-bin (2.35-0ubuntu3.8) ...

[ ]: !jupyter nbconvert --to PDF /content/drive/MyDrive/Clasificación\_Redes\_MCG.ipynb