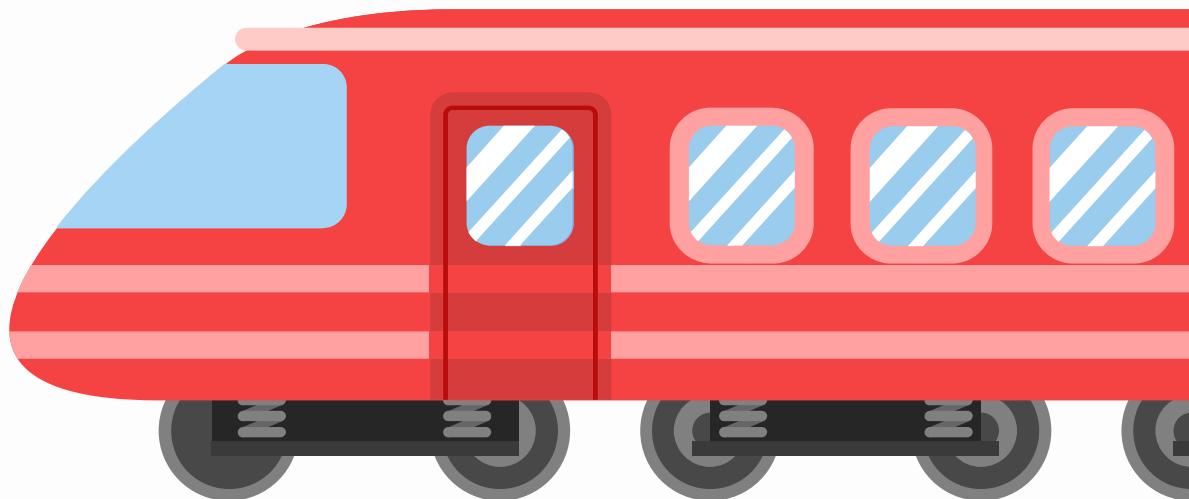


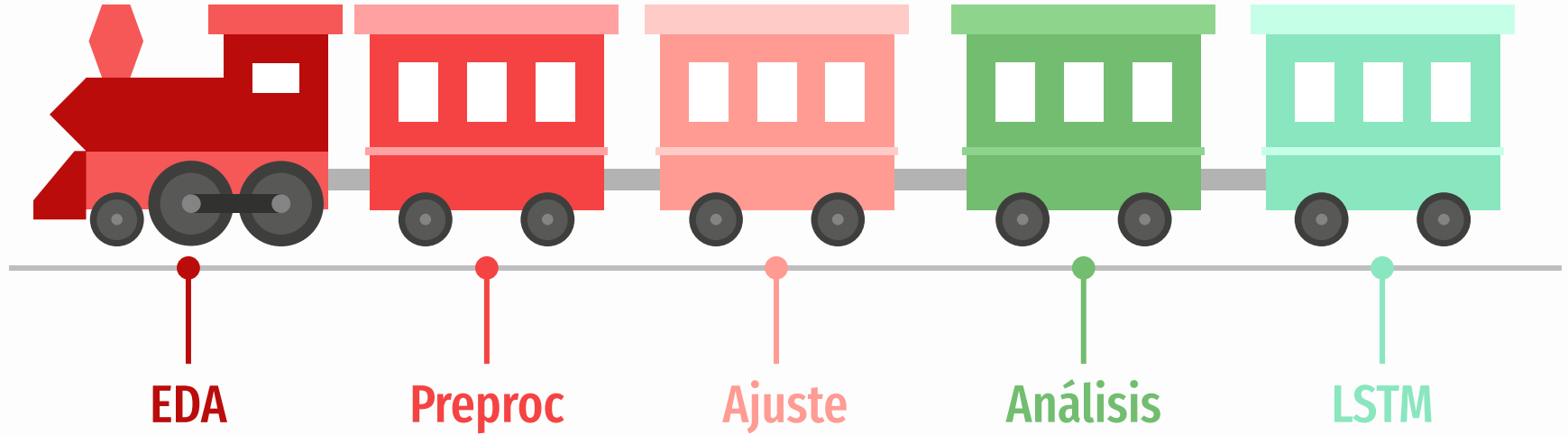
Análisis de viajes con Sube

Usando SARIMAX y LSTM

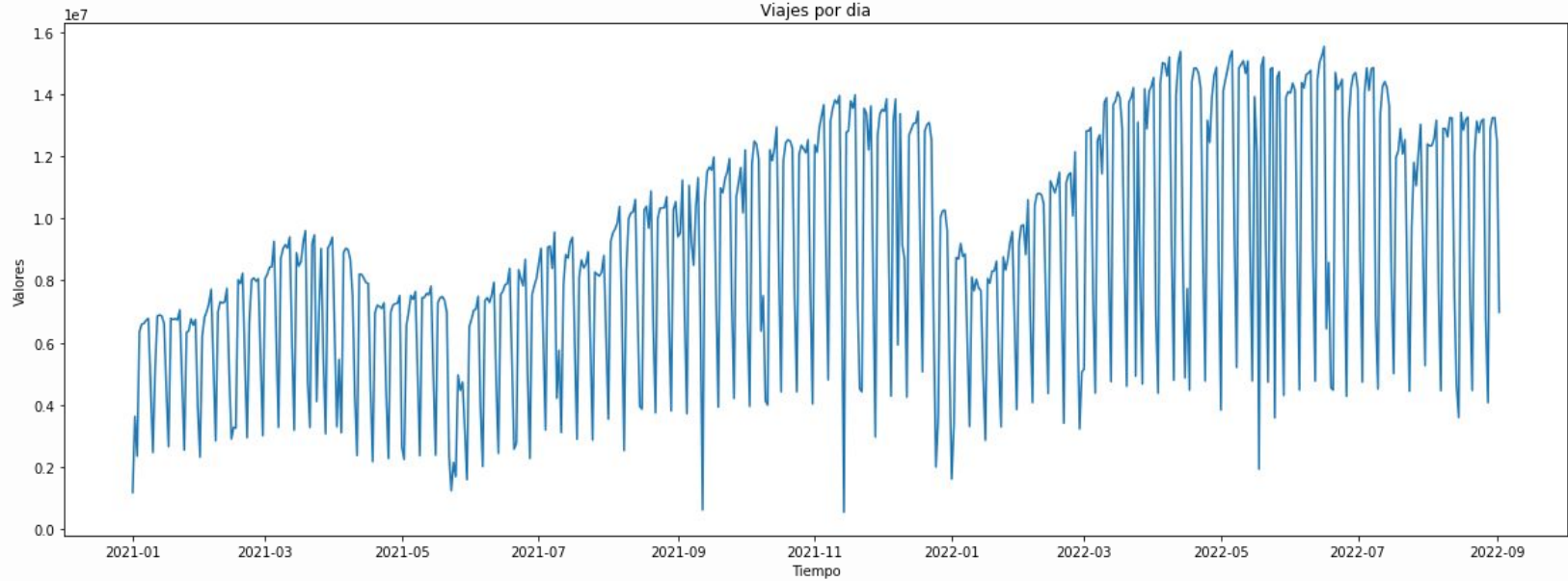
Alumno: Rivela Lucas



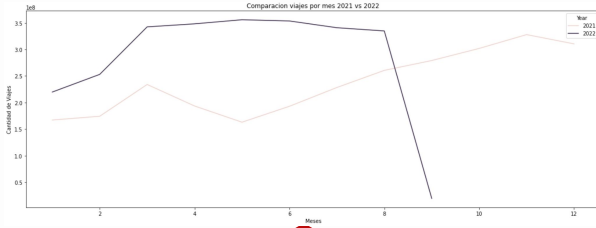
Agenda



Serie Original



2021 vs. 2022

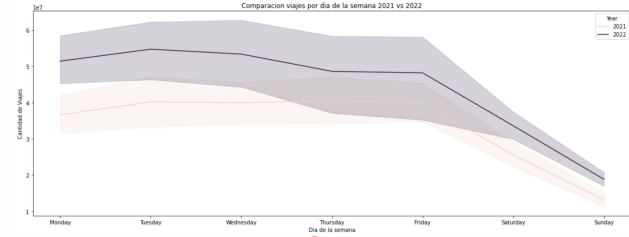


Por mes

2022 fue superior
en todos los
meses

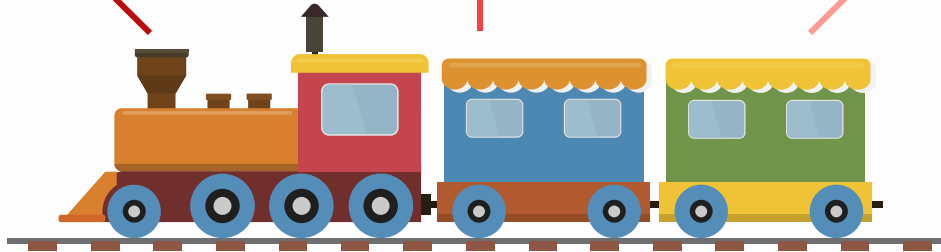
Por año

2022 tuvo más
viajes

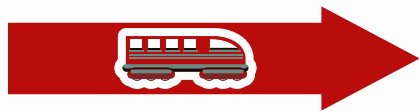


Por día

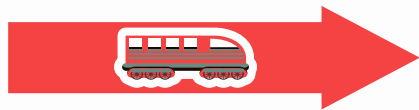
2022 fue superior
en todos los días



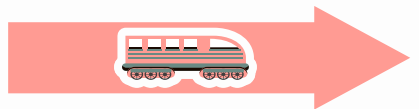
Modelo Aditivo de 4 componentes



Original



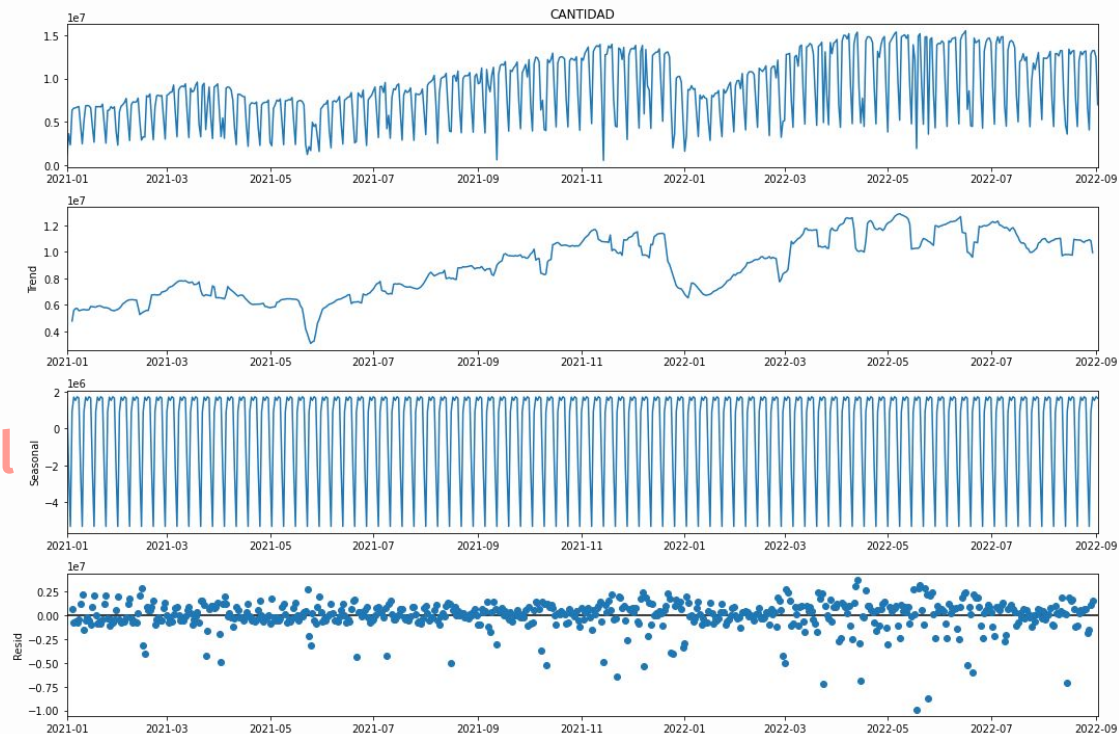
Trend



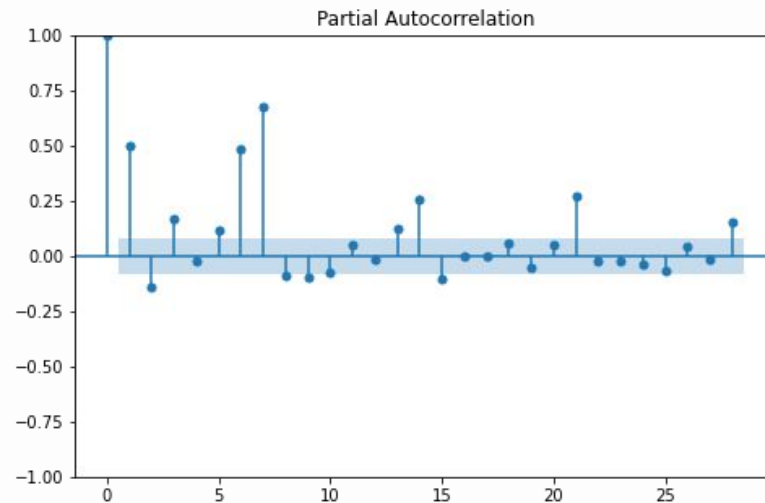
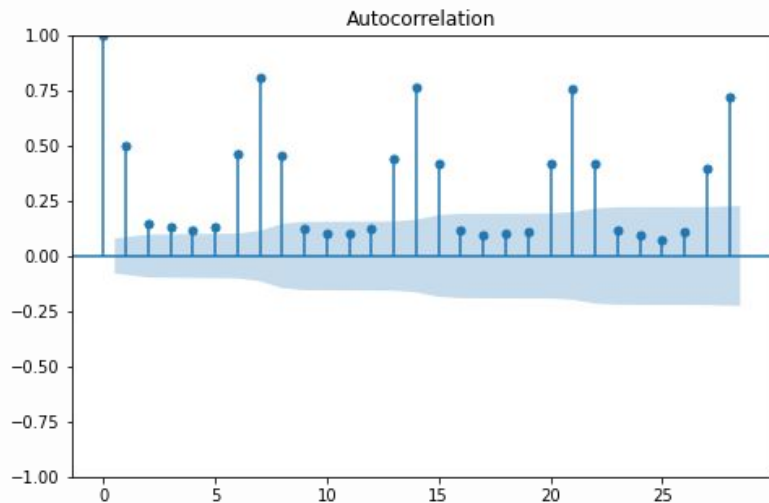
Seasonal



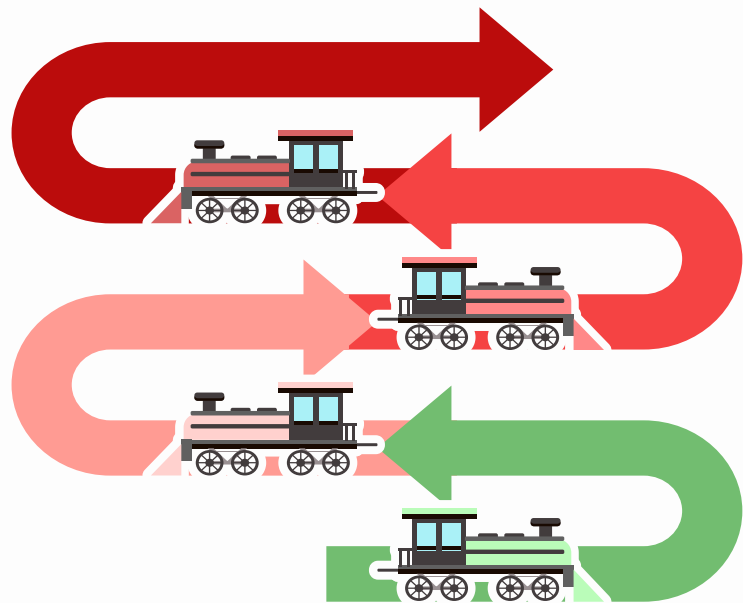
Resid



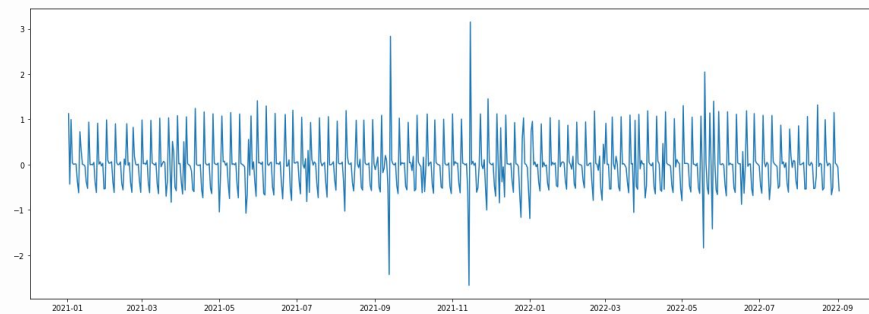
Análisis de Estacionariedad



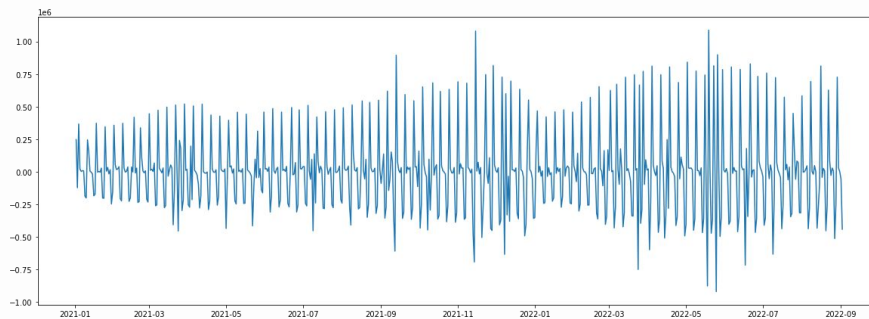
Aplico Transformaciones



Logaritmo

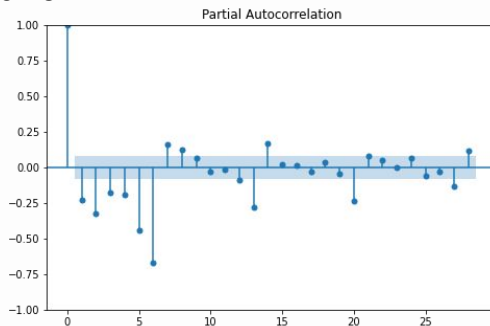
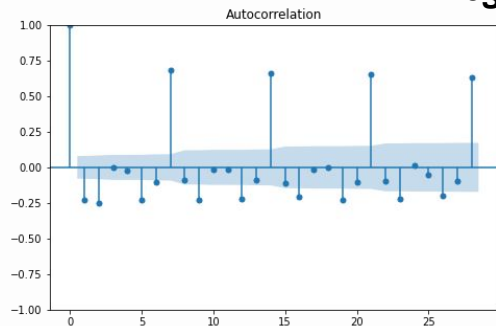


Box Cox

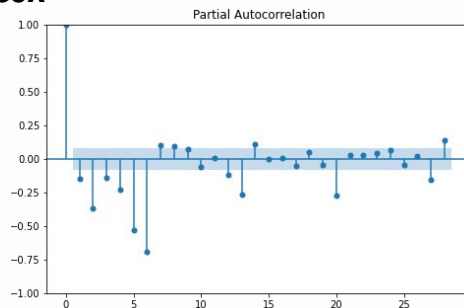
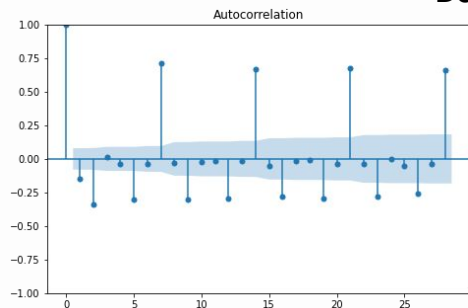


Estacionariedad luego de Transformaciones

Logaritmo



Box Cox

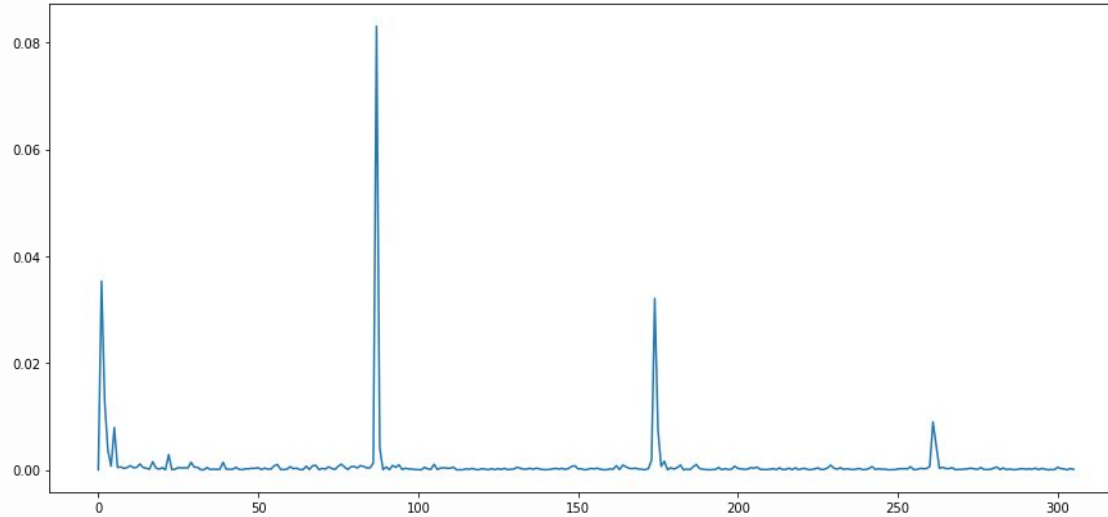


Posibles Parámetros

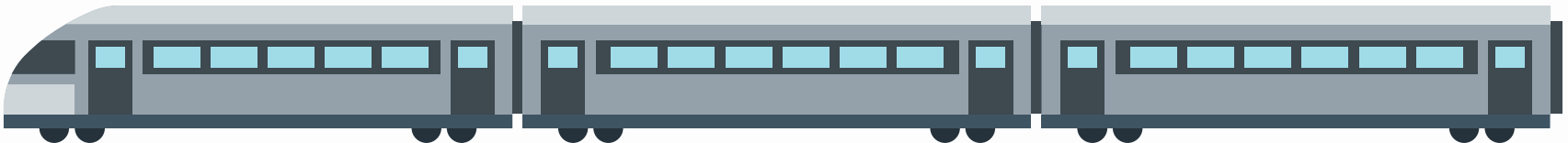


Parámetros	Logaritmo	Box Cox	Ljung-Box
p=6, q=2, P=1, Q=2	AIC=209.62 BIC=262.58	AIC=16268.77 BIC=16321.74	L1=0.1 P-value=0.76 L1=0 P-value=1
p=6, q=5, P=1, Q=2	AIC=248.79 BIC=314.995	-	
p=6, q=5, P=1, Q=5	AIC=239.73 BIC=319.17	-	
p=6, q=2, P=6, Q=2	AIC=208.59 BIC=283.61	AIC=16270.97 BIC=16346	L1=0.08 P-value=0.77 L1=0.02 P-value=0.88

Análisis Espectral



Frecuencia principal: 87
 $N=610 \rightarrow 610/87 \approx 7$ para seasonality



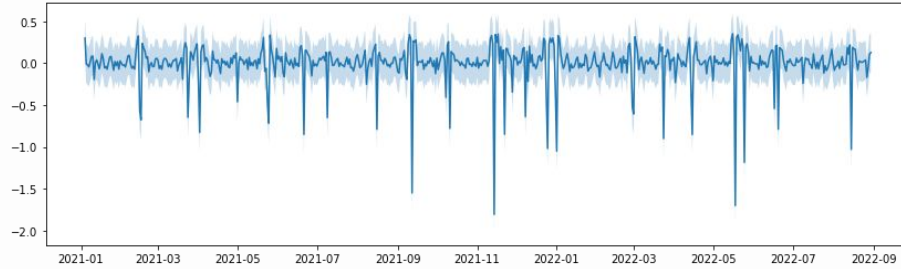
Análisis de Intervenciones



Se ve una intervención del 23 al 30 de mayo (posiciones 142 a 149)

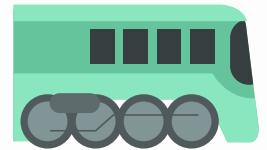
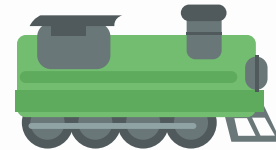
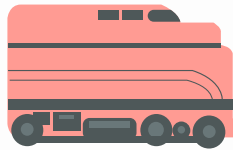
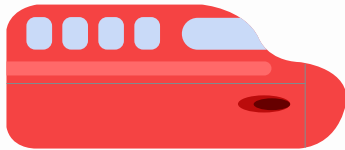
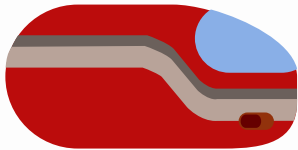
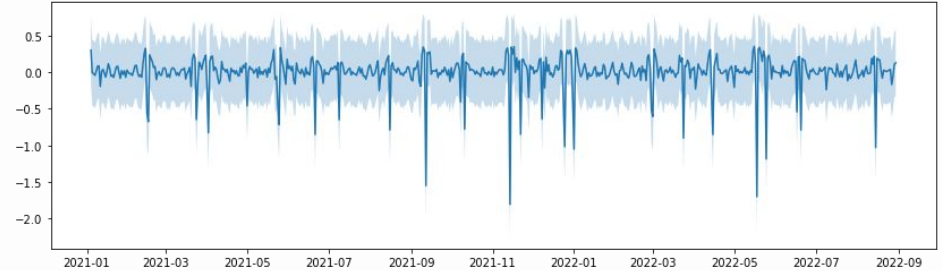


Análisis de Outliers

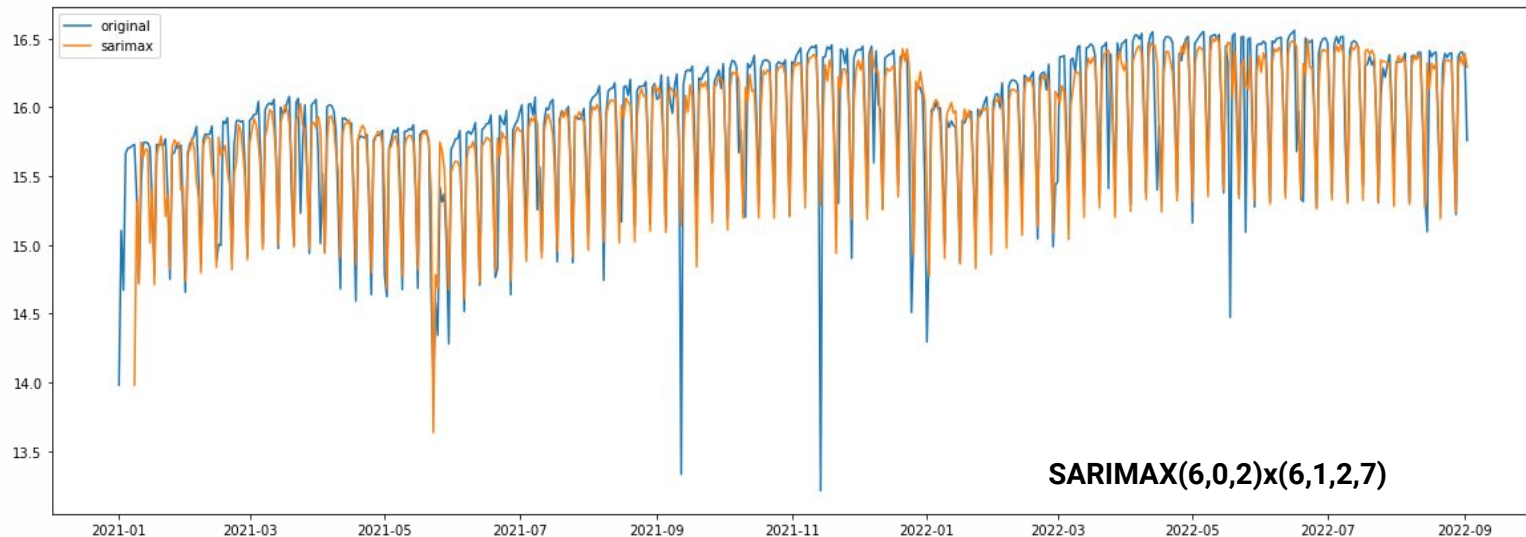


MAD

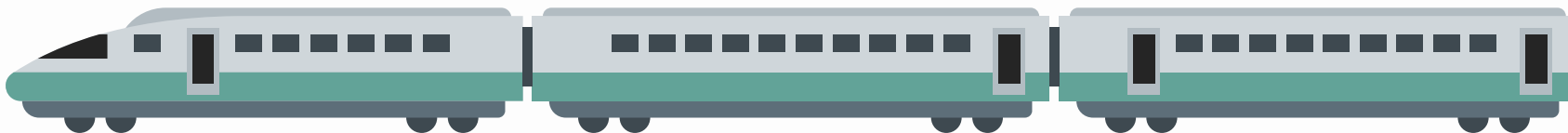
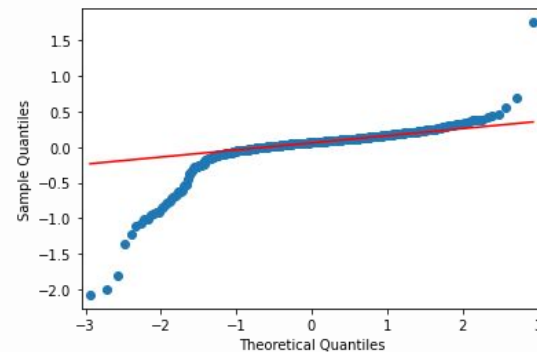
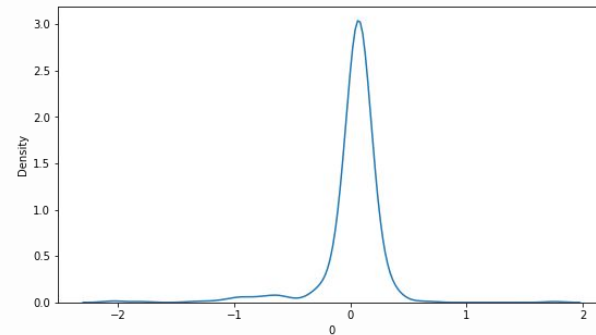
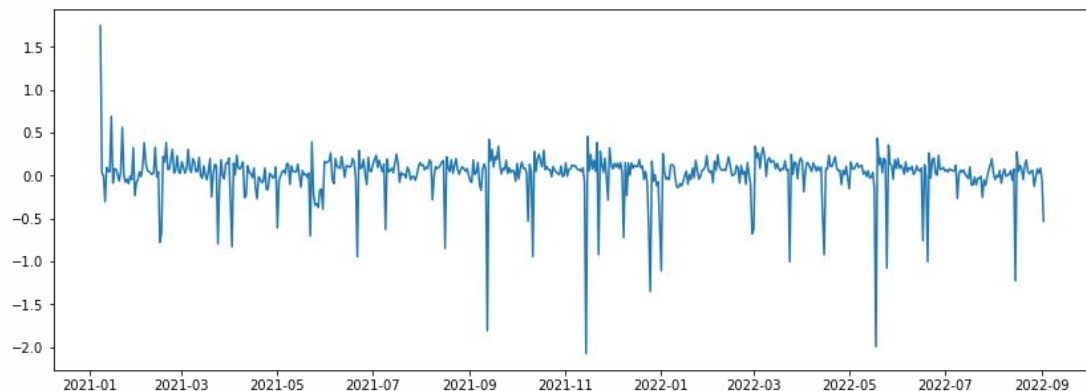
Std. Dev



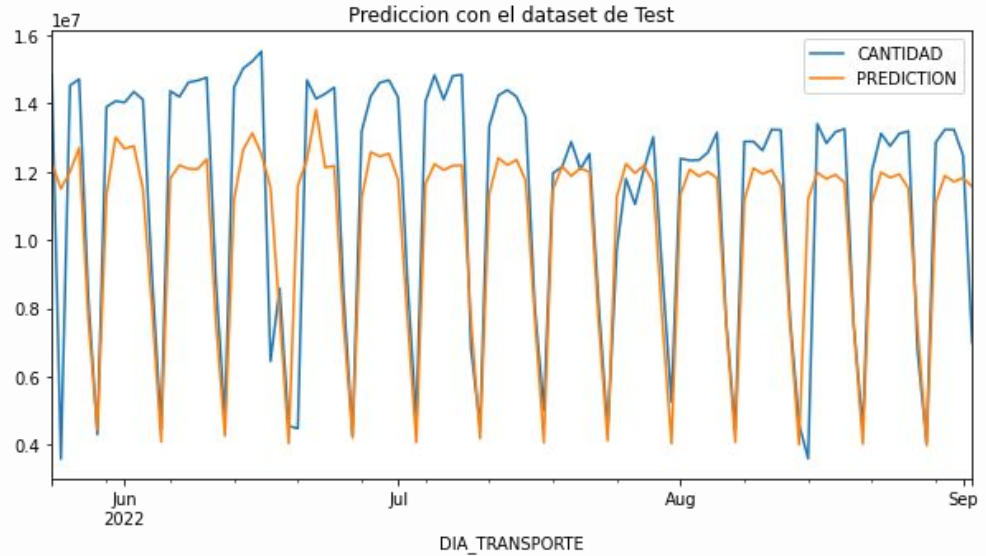
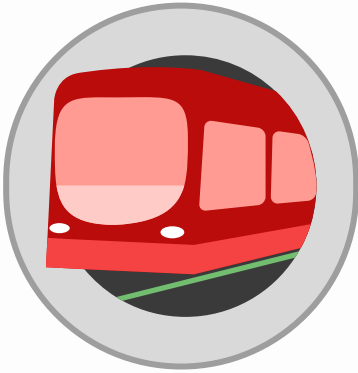
Ajuste sobre la Serie Original



Análisis de Residuos

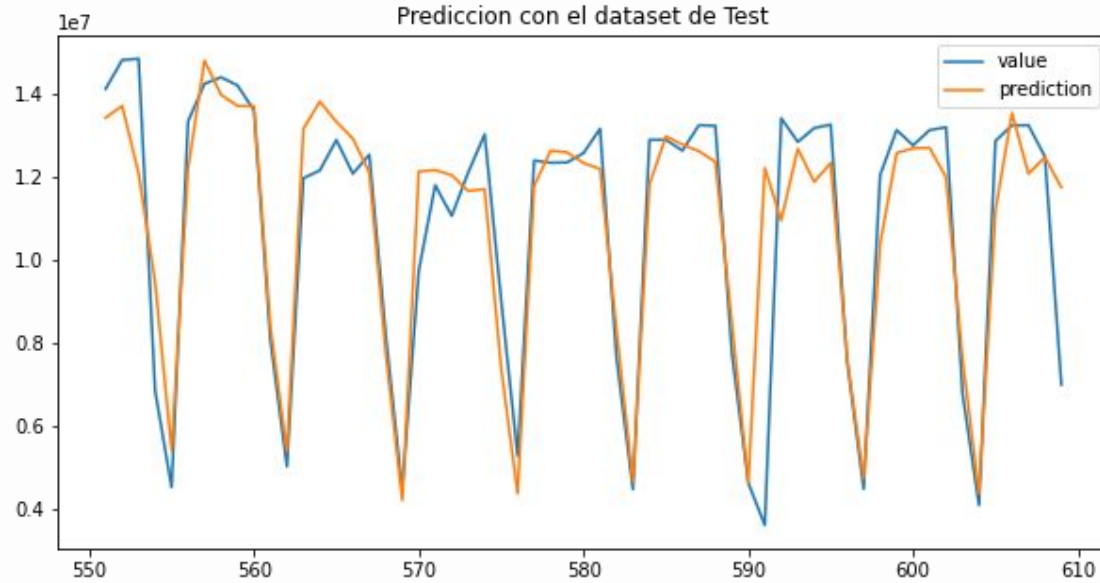


Forecast con SARIMAX



610 días → 508 días para train y 102 días para test


LSTM



Train: 464
Validation: 59
Test: 59



Conclusiones



Modelo	MAE	RMSE	R2
SARIMAX(6,0,2)x(6,1,2,7)	1567757	2111796	0.68
LSTM 100 lags	1203712	1911308	0.66
LSTM 14 lags	1070282	1732714	0.74
LSTM 28 lags	1026805	1676739	0.75
LSTM 28 lags + features	987388	1632806	0.77
GRU 28 lags + features	997282	1637664	0.77

Gracias!

