Ridge(l2)_Lasso(l1)_ ElasticNet(l1+l2) Regression model

Standardized Evaluation Metrics Table

Model	Alpha	l1_ratio	MSE	RMSE	MAE	R^2
Ridge	0.0001	–	8337.40	91.31	46.01	0.9713
Lasso	0.5964	–	8367.80	91.48	45.35	0.9712
Ridge (CV Tuned)	**0.0001**	**–**	**8013.62**	**89.52**	**45.31**	**0.9724**
Lasso (CV Tuned)	0.5964	–	8360.85	91.44	45.48	0.9712
ElasticNet (CV Tuned)	0.0054	0.9	8350.80	91.38	46.07	0.9712

Model Comparison Summary

- **Best Overall Model**:
  Ridge (CV Tuned) achieved the lowest MSE (8013.62) and the highest R^2 (0.9724), indicating the best fit and generalization performance on your test data.
- **Lasso vs ElasticNet:**
  Both models perform similarly, with Lasso having a slightly lower MAE and ElasticNet a slightly lower MSE, but neither surpasses Ridge.
- **Base Ridge vs Tuned Ridge:**
  Ridge performance greatly improves after tuning, demonstrating the importance of cross-validation.

Hyperparameter Summary

- **Ridge α** = 0.0001 → Small regularization strength, indicating a low-bias model performs well.

- **Lasso α** = 0.5964 → Stronger regularization; selects fewer features.

- **ElasticNet α** = 0.0054, **l1_ratio** = 0.9 → Mostly Lasso-like behavior.