

Partial Least Squares Regression

Test name: Partial Least Squares Regression

Dataset: D:/DATA ANALYSIS/H Regression Tests and Models/Partial Least Squares Regression/dataset.csv

Rows in original dataset: 649

Columns in original dataset: 33

Rows used in PLS model: 649

Outcome variable: G3

Numeric predictors: G1, G2, studytime, failures, absences, age, Medu, Fedu

Categorical predictors: school, sex, address, famsize

Design matrix columns after dummy coding: 13

Selected PLS components: 5

R squared: 0.8511

Adjusted R squared using components: 0.8499

RMSE: 1.2456

MAE: 0.7861

Best cross-validation RMSE: 0.3935

Interpretation: PLS components are supervised latent dimensions chosen to predict the outcome.

Coefficient guide: larger absolute coefficients show stronger directional contribution to the fitted outcome.

VIP guide: values near or above 1 are commonly interpreted as influential predictors.

Reporting guide: state outcome, predictors, selected components, R squared, RMSE, coefficients, VIP scores, and residual diagnostics.

Charts generated: 8

Model fit

model	n	design_matrix_predictors	selected_components	r_squared			
Partial Least Squares Regression	649		13	5 0.8511057			
adjusted_r_squared_using_components		rmse	mae	sse	sst	best_cv_rmse	intercept
	0.8499479	1.245647	0.7860755	1007.012	6763.267	0.3934881	0.4844308

Component selection

n_components	cv_rmse	cv_rmse_sd
1	0.5341503	0.06190410
2	0.4347891	0.06954505
3	0.4134372	0.06851434
4	0.4037782	0.06545268
5	0.3934881	0.06812107

Top coefficients

predictor	coefficient	coefficient_abs
G2	0.85331257	0.85331257
sexM	-0.20393159	0.20393159
G1	0.17469336	0.17469336
addressU	0.16209037	0.16209037
failures	-0.10569738	0.10569738
studytime	0.10487114	0.10487114
Medu	-0.09514381	0.09514381
schoolGP	0.08254725	0.08254725
schoolMS	-0.08254725	0.08254725
age	-0.03456687	0.03456687
Fedu	0.02682098	0.02682098
absences	0.02215466	0.02215466

Top VIP scores

predictor vip_score	
G2	2.1952801
G1	1.9327533
failures	0.9498421
schoolGP	0.8490865
schoolMS	0.8490865
Medu	0.7194534
studytime	0.6524352
Fedu	0.6453102
addressU	0.4970367
age	0.4612423
sexM	0.3836676
absences	0.3368930















