Converting log bayes factors to betas and standard errors in gwas

This is the function:

lbf\_to\_z\_cont <- function(lbf, n, af, prior\_v=50)

{

se = sqrt(1 / (2 \* n \* af \* (1-af)))

r = prior\_v / (prior\_v + se^2)

z = sqrt((2 \* lbf - log(sqrt(1-r)))/r)

beta <- z \* se

return(tibble(lbf, af, z, beta, se))

}

Converting between simulated Z scores and derived Z scores:

lm(formula = a$z^2 ~ ss$fval)

Residuals:

Min 1Q Median 3Q Max

-1.1059 -0.1195 0.1741 0.2988 0.5385

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.5226133 0.0195656 77.82 <2e-16 \*\*\*

ss$fval 0.9833590 0.0006255 1572.19 <2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.4232 on 499 degrees of freedom

Multiple R-squared: 0.9998, Adjusted R-squared: 0.9998

F-statistic: 2.472e+06 on 1 and 499 DF, p-value: < 2.2e-16

Example output of betas:

A graph with numbers and lines

Description automatically generated