

## Regression Splines with R Package *splines2*

WENJIE WANG\*<sup>1</sup> AND JUN YAN<sup>2</sup>

<sup>1</sup>*Eli Lilly and Company, Indianapolis, Indiana, USA.*

<sup>2</sup>*Department of Statistics, University of Connecticut, Storrs, Connecticut, USA.*

### Abstract

Splines are one of the most important tools for the flexible modeling of curves and surfaces in regression analyses. Functions to construct basic spline basis functions are available in the built-in R package *splines*. Oftentimes, the curves to be modeled have known characteristics in monotonicity and/or curvature. More efficient statistical inferences can be obtained if such characteristics in shape are modeled with shape restricted splines. The package *splines2* provides easy-to-use shape restricted spline basis functions and their derivatives and integrals. Further, the package provides splines and features that are not available in the *splines*, such as Bernstein splines and periodic splines. The usages of the functions are illustrated in applications to shape-restricted regression, recurrent event data analysis, and extreme-value copulas.

**Keywords** *Cox-de Boor algorithm; monotonic regression; shape-restricted regression.*

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\*Corresponding Author. Email: wang@wwenjie.org.