



**Figure 4.6** *The group-lasso ball (left panel) in  $\mathbb{R}^3$ , compared to the overlap-group-lasso ball (right panel). Depicted are two groups in both. In the left panel the groups are  $\{X_1, X_2\}$  and  $X_3$ ; in the right panel the groups are  $\{X_1, X_2\}$  and  $\{X_2, X_3\}$ . There are two rings corresponding to the two groups in the right panel. When  $\beta_2$  is close to zero, the penalty on the other two variables is much like the lasso. When  $\beta_2$  is far from zero, the penalty on the other two variables “softens” and resembles the  $\ell_2$  penalty.*