3. Fluctuation rate

3.1 Single joint

As explained under 2.1, on a single joint the output velocity deviates from the input velocity. This means, the speed ratio is not uniform. This non-uniformity (fluctuation) can be calculated as a dimensionless value:

Fluctation rate

$$U = \frac{\omega_{2\,max} - \omega_{2\,min}}{\omega_1} = \frac{1}{\cos ß} - \cos ß$$

3.2 Universal driveline (2 joints connected in series)

If the preconditions listed in Chapter 1 for obtaining a complete motion compensation cannot be met, it must be aimed for that:
$U \leqq 0{,}0027$.

3.3 Universal driveline with more than two joints

Design requirements might dictate the use of a universal driveline that employs more than 2 joints. This universal driveline, however, must then incorporate an intermediate bearing.
Here, also, the condition applies:
$U_{Res} \leqq 0{,}0027$.
Here, U_{Res} expresses the total fluctuation of the driveline.
Observe, when determining U_{Res}:

a) Joints with the same fork position get the same sign.
b) The fluctuation rate of each joint must be calculated individually U_1, U_2, U_3.
c) The signs must be observed when adding:

$$U_{Res} = \pm U_1 \pm U_2 \pm U_3$$

Since the rate of fluctuation is a function of deflection angle ß, a limiting condition can be set in regard to the resulting deflection angle $ß_{res}$

$$ß_{res} = \sqrt{\pm ß_1^2 \pm ß_2^2 \pm ß_3^2} \leqq 3°$$

$ß_{res}$ corresponds to the deflection angle of a single joint if it were to replace the entire driveline.