Elastic mill spring PyRoll Plugin

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This plugin calculates the elastic roll stand feedback according to the Gaugemeter equation.

1 Model approach

During rolling, the stand in which the rolls as well as secondary equipment are mounted, is normally treated as rigid. Measurements and investigations by Weber [1] show, that this is not correct and the whole setup should be viewed as an elastic system of springs. Since not all of those values can be measured sufficiently, the elastic response of the whole stand is modeled by a single spring constant (C). This constant is depended on the roll force (F_W) which is applied and therefore leads to a offset between set (s_0) and real (s_1) roll gap. This can be modeled according to the Gaugemeter equation.

$$s_1 = s_0 + \frac{F_W}{C_S} \tag{1}$$

2 Usage instructions

The plugin can be loaded under the name `pyroll_elastic_mill_spring`.

An implementation of the hook `gap` is provided on the `RollPass`. Furthermore, a hook calculating the `roll_gap_offset` is provided. Several additional hooks on `RollPass` are defined, which are used for calculation, as listed in Table 1.

Table 1: Hooks specified by this plugin.

Hook name	Meaning
`mill_stand_stiffness`	Spring coefficient of the stand C_S

References

[1] K. H. Weber. *Grundlagen des Bandwalzens*. de. 1st ed. Leipzig: VEB Deutscher Verlag für Grundstoffindustrie, 1973.