

IBS notes for JSPEC

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We document the model implemented in JSPEC.

The model is based on that of Martini and implemented in Betacool. Let us consider the evolution of the emittances which are defined as

$$\epsilon_x = \gamma_x x^2 + 2\alpha_x x x' + \beta_x x'^2 \quad (1)$$

$$\epsilon_y = \gamma_y y^2 + 2\alpha_y y y' + \beta_y y'^2 \quad (2)$$

$$\epsilon_z = \gamma_z z^2 + 2\alpha_z z \delta + \beta_z \delta^2 \quad (3)$$

where $\delta = \frac{E-E_0}{E_0}$. The IBS growth rates are defined as

$$\frac{1}{\tau_a} = \frac{1}{\epsilon_a} \frac{d\epsilon_a}{dt} \quad (4)$$

with $a = 1, 2, 3$.

These rates are given by Martini (implemented in Betacool and JSPEC) as

$$\frac{1}{\tau_x} = \left\langle \frac{A}{2} \left[f_2 + (d^2 + \tilde{d}^2) f_1 \right] \right\rangle \quad (5)$$

(check factor of 2)

References