

A Ableitungen

Mit $\tau_i' = \tau_i - \Delta t_{\text{pre}}$ und $\Delta\phi' = \Delta\phi + 2\pi\Delta t_{\text{pre}}f_D$ folgt aus Gleichung (16)

$$P(f_D; \Delta t; \Delta\phi') = \sum_{i=-N/2}^{N/2-1} R_i e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (20)$$

$$\frac{\partial P}{\partial f_D} = - \sum_{i=-N/2}^{N/2-1} 2\pi R_i \tau_i' e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \sin(2\pi f_D \tau_i' + \Delta\phi') \quad (21)$$

$$\frac{\partial^2 P}{\partial f_D^2} = - \sum_{i=-N/2}^{N/2-1} 4\pi^2 R_i (\tau_i')^2 e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (22)$$

$$\frac{\partial P}{\partial \Delta t} = \sum_{i=-N/2}^{N/2-1} R_i \frac{\tau_i - \Delta t}{b_R^2} e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (23)$$

$$\frac{\partial^2 P}{\partial \Delta t^2} = \sum_{i=-N/2}^{N/2-1} R_i \left[\frac{(\tau_i - \Delta t)^2}{b_R^4} - \frac{1}{b_R^2} \right] e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (24)$$

$$\frac{\partial P}{\partial \Delta\phi'} = - \sum_{i=-N/2}^{N/2-1} R_i e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \sin(2\pi f_D \tau_i' + \Delta\phi') \quad (25)$$

$$\frac{\partial^2 P}{\partial \Delta\phi'^2} = - \sum_{i=-N/2}^{N/2-1} R_i e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (26)$$

$$\frac{\partial^2 P}{\partial f_D \partial \Delta t} = - \sum_{i=-N/2}^{N/2-1} 2\pi R_i \tau_i' \frac{\tau_i - \Delta t}{b_R^2} e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \sin(2\pi f_D \tau_i' + \Delta\phi') \quad (27)$$

$$\frac{\partial^2 P}{\partial f_D \partial \Delta\phi'} = - \sum_{i=-N/2}^{N/2-1} 2\pi R_i \tau_i' e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \cos(2\pi f_D \tau_i' + \Delta\phi') \quad (28)$$

$$\frac{\partial^2 P}{\partial \Delta t \partial \Delta\phi'} = - \sum_{i=-N/2}^{N/2-1} R_i \frac{\tau_i - \Delta t}{b_R^2} e^{-\frac{(\tau_i - \Delta t)^2}{2b_R^2}} \sin(2\pi f_D \tau_i' + \Delta\phi') \quad (29)$$