$$S\{f\}(x)=\lim_{\Delta x\to 0}\hat{y}(x)=\int_{x'=-\infty}^{\infty} f(x')\cdot h(x-x')\cdot dx'$$

$$Y(\xi)=F(\xi)\cdot H(\xi),\ \mathbf{H}/\mathbf{H}(0,0),\ \left|\mathbf{H}/\mathbf{H}(0,0)\right|,$$

$$\lim_{Nx,Ny,M\to\infty}\frac{1}{X\cdot Y}\left\langle\left|F\left\{I^{(1:M)}-\bar{I}\right\}\right|^2\right\rangle,$$

$$NEQ(u,v)=MTF^2(u,v)/NNPS(u,v),$$

$$DQE(u,v)=NEQ(u,v)/Q$$

$$F(\omega)=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} f(x)\exp\{-j\cdot x\cdot\omega\}dx,$$

$$f(x)=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} F(\omega)\exp\{j\cdot x\cdot\omega\}d\omega;$$

$$E=\int_{-\infty}^{\infty}\left|F(\omega)\right|^2 d\omega,\ F(-\omega)=\overline{F(\omega)};$$

$$c_n=\frac{1}{T}\int_{-T/2}^{T/2} f(x)\cdot\exp(-j\cdot x\cdot 2\pi n/T)\,dx,$$

$$f(x)=\sum_{n=-\infty}^{\infty} c_n\cdot\exp\{j\cdot x\cdot 2\pi n/T\};$$

$$X(\omega+2\cdot n\cdot\pi)\big|_{n\in\mathbb{Z}}=\sum_{n=-\infty}^{\infty} x_\infty[n]\exp\{-j\cdot\omega\cdot n\},$$

$$x_\infty[n]=1/2\pi\cdot\int_{-\pi}^{\pi} X(\omega)\exp\{j\cdot\omega\cdot n\}d\omega,$$

$$FT_{(\omega)}\left\{\sum_k\delta(x-k\cdot\Delta x)\right\}=\frac{\sqrt{2\pi}}{\Delta x}\cdot\left(\sum_k\delta\left(\omega-k\cdot\frac{2\pi}{\Delta x}\right)\right)$$

$$x_R=x_S*h_R;\ X_k=\sum_{n=0}^{N-1}x[n]\cdot\exp\left\{-j\cdot n\cdot k\cdot\frac{2\pi}{N}\right\},$$

$$x[n]=\frac{1}{N}\sum_{n=0}^{N-1}X_k\cdot\exp\{j\cdot 2\pi kn/N\},\ \omega_k=\frac{2\pi\cdot k}{N\cdot\Delta x},$$

$$x[n]=x_\infty[n]\cdot h[n],\ X_k=(X*H)(k\cdot\Delta\omega);$$

$$F_{u,v}=\sum_{m=0}^{M-1}\sum_{n=0}^{N-1} f[m,n]\exp\{-2\pi j\cdot(u\cdot m/M+v\cdot n/N)\}$$

$$g=h*f+\eta,\ \tilde{F}=F\circ(H/H)+N/H,$$

$$f^{Wiener}=\arg\min\left\{\mathrm{E}\left\{\left\|f^{Wiener}-f^{valódi}\right\|^2\right\}\right\},$$

$$F_{(u)}^{Wiener}=H_{(u)}^{Wiener}\cdot G_{(u)}$$

$$H_{(u)}^{Winer}=\frac{H_{(u)}^*}{\left|H_{(u)}\right|^2+\mathrm{E}\left\{\left|N_{(u)}\right|^2\right\}\Big/\mathrm{E}\left\{\left|F_{(u)}\right|^2\right\}};$$

$$f_{ML,Gauss}^*=\left(H'^T\cdot\Sigma^{-1}\cdot H'\right)^{-1}\cdot H'^T\cdot\Sigma^{-1}\cdot g;$$

$$\mathrm{P}_{(r+1)}\left\{f_{(i)}\right\}=\sum_k\frac{\mathrm{P}\left\{g_{(k)}\left|f_{(i)}\right.\right\}\cdot\mathrm{P}\left\{g_{(k)}\right\}}{\sum_j\mathrm{P}\left\{g_{(k)}\left|f_{(j)}\right.\right\}\cdot\mathrm{P}_{(r)}\left\{f_{(j)}\right\}}\cdot\mathrm{P}_{(r)}\left\{f_{(i)}\right\};$$

$$\mathrm{P}\{f|g\}\propto\left(\mathrm{P}\{g|f\}\cdot\mathrm{P}\{f\}\right),$$

$$-\log\left(\mathrm{P}\{f|g\}\right)=\Phi_{ML}(f)+\Phi_{prior}(f)+K;$$

$$\Phi_{ML}(f)=\left\|g-h*f\right\|_\alpha^\beta,\ \Phi_{prior}(f)=\left\|D(f)\right\|_\alpha^\beta;$$

$$\mathbf{x}^*=\arg\min_{\mathbf{x}}\left\{E(\mathbf{x})=E_{\mathrm{int}}(\mathbf{x})+E_{im}(\mathbf{x})+E_{ext}(\mathbf{x})\right\},$$

$$\mathbf{x}^{(t+1)}=\mathbf{x}^{(t)}+\arg\min_{\delta\mathbf{x}}\left\{E\left(\mathbf{x}^{(t)}+\delta\mathbf{x}\right)-E\left(\mathbf{x}^{(t)}\right)\right\},$$

$$E(\mathbf{x})=\int_0^1 P(\mathbf{x}(s))ds+\frac{\alpha}{2}\int_0^1\left|\frac{\partial\mathbf{x}(s)}{\partial s}\right|^2ds+\frac{\beta}{2}\int_0^1\left|\frac{\partial^2\mathbf{x}(s)}{\partial s^2}\right|^2ds$$

$$E(\mathbf{x}+\delta\mathbf{x})=\int_0^1 P(\mathbf{x}+\delta\mathbf{x})ds+\frac{\alpha}{2}\int_0^1\left|\mathbf{x}'+\delta\mathbf{x}'\right|^2ds+\ldots$$

$$\ldots+\frac{\beta}{2}\int_0^1\left|\mathbf{x}''+\delta\mathbf{x}''\right|^2ds\ ,\ \frac{\delta\left(\mathbf{u}^T\cdot\mathbf{v}\right)}{\delta s}=\frac{\delta\mathbf{u}^T}{\delta s}\cdot\mathbf{v}+\mathbf{u}^T\cdot\frac{\delta\mathbf{v}}{\delta s}$$

$$\delta\mathbf{x}=\left(\alpha\cdot\frac{\delta^2\mathbf{x}}{\delta s^2}-\beta\cdot\frac{\delta^4\mathbf{x}}{\delta s^4}-\frac{\partial P}{\partial\mathbf{x}}\right)\cdot\delta t;$$

$$\delta E(\mathbf{x})=0\Leftrightarrow\partial P/\partial\mathbf{x}-\alpha\cdot\mathbf{x}''+\beta\cdot\mathbf{x}''''=\mathbf{0},$$

$$\frac{\delta\mathbf{u}^{(t+0,5)}}{\delta t}=\alpha\cdot\frac{\delta^2\mathbf{x}^{(t+1)}}{\delta s^2}-\beta\cdot\frac{\delta^4\mathbf{x}^{(t+1)}}{\delta s^4}-\frac{\partial P}{\partial\mathbf{x}^{(t)}},$$

$$\delta\mathbf{x}=-\delta t\cdot\left(\frac{\partial P}{\partial\mathbf{x}}-\alpha\cdot\mathbf{x}''+\beta\cdot\mathbf{x}''''-\gamma\cdot\vec{\mathrm{n}}(\mathbf{x})\right)$$

$$\mathbf{I}_{(x0,y0)}=\int_{E_{\min}}^{E_{\max}} I_0(E)\cdot\exp\left\{-\int_{P(x0,y0)}\mu(E,\mathbf{x})d\mathbf{x}\right\}dE,$$

$$P_\theta(t)=\iint_{x,y} f(x,y)\cdot\delta\left(x\cdot\cos(\theta)+y\cdot\sin(\theta)-t\right)dxdy,$$

$$S_\theta(\rho)=FT_\rho\left\{P_\theta(t)\right\},\ u=\omega\cdot\cos(\theta);\ v=\omega\cdot\sin(\theta),$$

$$f(x,y)=\iint_{u,v}F(u,v)\cdot\exp\left(j2\pi(ux+vy)\right)dvdu,$$

$$f(x,y)=\int_0^\pi Q_\theta\left(\mathrm{x}\cos(\theta)+y\sin(\theta)\right)d\theta;$$

$$\mathbf{g}=\mathbf{H}\cdot\mathbf{f}+\boldsymbol{\eta},\ \mathbf{f}^{(k+1)}=\mathbf{f}^{(k)}-\alpha\cdot\mathbf{H}_{(i,:)}{}^T,\ \mathbf{g}_{(i)}=\mathbf{H}_{(i,:)}\cdot\mathbf{f}^{(k+1)},$$

$$\mathbf{f}^{(k+1)}=\mathbf{f}^{(k)}+\lambda\cdot\sum_j\left(\mathbf{g}_{(j)}-\mathbf{H}_{(j,:)}\cdot\mathbf{f}^{(k)}\right)\frac{\mathbf{H}_{(j,:)}{}^T}{\mathbf{H}_{(j,:)}\cdot\mathbf{H}_{(j,:)}{}^T},$$

$$\mathbf{f}^{(k+1)}=\mathbf{f}^{(k)}\cdot\left(1-\mu\cdot\left(1-\frac{\mathbf{g}_{(j)}}{\mathbf{H}_{(j,:)}\cdot\mathbf{f}^{(k)}}\right)\right)\Bigg|_{\mu>0};$$

$$x^{(k+1)}(b)=\frac{\sum_d y(d)\cdot p^{(k+1)}(b|d)}{\sum_d p(d|b)};$$

$$\mathbf{f}^*=\arg\min_{\mathbf{f}}\left\{\left\|\mathbf{g}-\mathbf{H}\cdot\mathbf{f}\right\|_2^2+\lambda\cdot\left\|\mathbf{D}\cdot\mathbf{f}\right\|_1\right\},$$

$$\Phi(\mathbf{f},\mathbf{z})\triangleq\left\|\mathbf{g}-\mathbf{H}\cdot\mathbf{f}\right\|_2^2+\lambda\cdot\left\|\mathbf{z}\right\|_1+\beta\cdot\left\|\mathbf{z}-\mathbf{D}\cdot\mathbf{f}\right\|_2^2,$$

$$L_{Huber}(\mathbf{x})=\begin{cases}\left\|\mathbf{x}\right\|_2^2/2 & \left\|\mathbf{x}\right\|_2\le\varepsilon\\ \varepsilon\cdot\left\|\mathbf{x}\right\|_2-\varepsilon^2/2 & \left\|\mathbf{x}\right\|_2>\varepsilon\end{cases},$$

$$\mathbf{g}_{(j)}(\omega)=\mathbf{T}(\omega)\cdot\mathbf{f}_{(j)}(\omega),$$

$$cond(\mathbf{T}) = \max_{\mathbf{e},\mathbf{b}} \left\{ \frac{\left\|\mathbf{T}^{-1}\cdot\mathbf{e}\right\|_2 / \left\|\mathbf{e}\right\|_2}{\left\|\mathbf{T}^{-1}\cdot\mathbf{b}\right\|_2 / \left\|\mathbf{b}\right\|_2} \right\} = \sigma_{\max}/\sigma_{\min}$$

$$\mathbf{T}^{\dagger} = \mathbf{V}\cdot\mathbf{\Sigma}^{\dagger}\cdot\mathbf{U}^{*},\ \mathbf{\Sigma}^{\dagger}_{(i,i)} = \begin{cases} 1/\sigma_i & |\sigma_i > \varepsilon \\ 0 & |\sigma_i \le \varepsilon \end{cases}$$

$$I = \int I_0(E)\cdot\exp\left\{-\int_{p(\mathbf{x})}\mu(\mathbf{x},E)\,d\mathbf{x}\right\}dE,\ E = h\cdot(c/\lambda),$$

$$E\{X\} = \sigma\{X\}^2 = Q,$$

$$D = \log_2\{(FWC/P)/(P\cdot RN + ADCN)\}$$

$$LoG = \frac{\partial^2}{\partial x^2}G_\sigma(x,y) + \frac{\partial^2}{\partial y^2}G_\sigma(x,y),$$

$$\log(a\cdot b) = \log(a) + \log(b)$$

$$p(g) = P_1\cdot p_1(g) + P_2\cdot p_2(g),$$

$$p_i(g) \propto \exp\left\{-(g-\mu_i)^2/(2\sigma_i^2)\right\},\ Y = X\cup Z,$$

$$Q(h|h') := E\{P(Y|h')|h,X\},\ h := \arg\max_{h'}\{Q(h|h')\}$$

$$r = x_i\cdot\cos(\varphi) + y_i\cdot\sin(\varphi),$$

$$\varepsilon^2 = E\left\{\|\mathbf{x}-\hat{\mathbf{x}}\|^2\right\} = \sum_{i=M+1}^{N} E\left\{\|y_i\cdot\boldsymbol{\varphi}_i\|^2\right\} = \sum_{i=M+1}^{N} E\left\{(\boldsymbol{\varphi}_i^T\cdot\mathbf{x})^2\right\}$$

$$= \sum_{i=M+1}^{N} E\left\{\boldsymbol{\varphi}_i^T\mathbf{R}_{\mathbf{xx}}\boldsymbol{\varphi}_i\right\} = \sum_{i=M+1}^{N}\boldsymbol{\varphi}_i^T\lambda_i\boldsymbol{\varphi}_i,$$

$$\mathbf{R}_{x,x} = E\left\{(\mathbf{x}-E\{\mathbf{x}\})\cdot(\mathbf{x}-E\{\mathbf{x}\})^T\right\},$$

$$x = x_0 + \sum a_n\cdot\sin(n\Theta+\phi_n),\ y = y_0 + \sum b_n\cdot\sin(n\Theta+\psi_n)$$

$$R(\mathbf{w}) = E_{\mathbf{x},d}\{L(d, f(\mathbf{x},\mathbf{w}))\},\quad R(\mathbf{w}) = \int_{\mathbf{z},\mathbf{w}} L(\mathbf{z},\mathbf{w})p(\mathbf{w},\mathbf{z})\,d\mathbf{z}\,d\mathbf{w}$$

$$R_E(\mathbf{w}) = \frac{1}{P}\sum_{i=1}^{P}(d_i - f(\mathbf{w},\mathbf{x}_i))^2,$$

$$R(\mathbf{w}) \le R_{emp}(\mathbf{w}) + \frac{\varepsilon(h)}{2}\sqrt{1+\frac{4R_{emp}(\mathbf{w})}{\varepsilon(h)}},$$

$$\varepsilon(h) = 4\,\frac{h(\ln(2l/h)+1) - \ln(\eta/4)}{l},$$

$$h \le \min\left(\left\lceil R^2\|\mathbf{w}\|^2\right\rceil, N\right) + 1$$

$$C(\mathbf{w}) = \frac{(m_2-m_1)^2}{s_1^2+s_2^2},\ m_2 - m_1 = \mathbf{w}^{\mathrm{T}}(\mathbf{m}_2-\mathbf{m}_1),$$

$$(m_2-m_1)^2 = \mathbf{w}^T(\mathbf{m}_2-\mathbf{m}_1)(\mathbf{m}_2-\mathbf{m}_1)^T\mathbf{w} = \mathbf{w}^T\mathbf{S}_B\mathbf{w},$$

$$s_1^2+s_2^2 = \sum_{i\in C^{(1)}}\mathbf{w}^T(\mathbf{x}_i-\mathbf{m}_1)(x_i-\mathbf{m}_1)^T\mathbf{w} + \sum_{i\in C^{(2)}}\mathbf{w}^T(\mathbf{x}_i-\mathbf{m}_2)(x_i-\mathbf{m}_2)^T\mathbf{w}$$

$$s_1^2+s_2^2 = \mathbf{w}^T(\mathbf{S}_{W1}+\mathbf{S}_{W2})\mathbf{w} = \mathbf{w}^T\mathbf{S}_W\mathbf{w},$$

$$C(\mathbf{w}(k)) = \varepsilon^2(k) = (d(k) - \mathbf{x}^T(k)\mathbf{w}(k))^2,$$

$$\mathbf{w}(k+1) = \mathbf{w}(k) - \mu\hat{\nabla}C(k) = \mathbf{w}(k) + 2\mu\varepsilon(k)\mathbf{x}(k),$$

$$\mathbf{w}(k+1) = \mathbf{w}(k) + \alpha(k)\frac{\varepsilon(k)}{\mathbf{x}^T(k)\mathbf{x}(k)}\mathbf{x}(k),$$

$$C_{\mathbf{w}_0}\{\mathbf{w}+\mathbf{w}_0\} = C\{\mathbf{w}_0\} + \mathbf{w}^T\cdot\nabla C\{\mathbf{w}_0\} + (1/2)\cdot\mathbf{w}^T\cdot\mathbf{H}\{\mathbf{w}_0\}\cdot\mathbf{w}$$

$$\mathbf{w}(k+1) = \mathbf{w}(k) - \mathbf{H}(\mathbf{w}(k))^{-1}\nabla C(\mathbf{w}(k)).$$

$$\mathbf{w}(k+1) = \mathbf{w}(k) - (\mathbf{H}(\mathbf{w}(k)) + \lambda(k)\mathbf{I})^{-1}\nabla C(\mathbf{w}(k)),$$

$$p(\mathcal{C}_1|\mathbf{x}) = \frac{p(\mathbf{x}|\mathcal{C}_1)p(\mathcal{C}_1)}{p(\mathbf{x}|\mathcal{C}_1)p(\mathcal{C}_1)+p(\mathbf{x}|\mathcal{C}_2)p(\mathcal{C}_2)} = \frac{1}{1+\exp(-a)},$$

$$\arg\min\left\{\|\mathbf{w}\|^2 \,\middle|\, d_i(\mathbf{w}_i^T\cdot\mathbf{x}_i + b) \ge 1\right\}$$

$$L(\mathbf{w},b,\boldsymbol{\alpha}) = \frac{1}{2}\mathbf{w}^T\mathbf{w} - \sum_{i=1}^{P}\alpha_i\left[d_i(\mathbf{w}^T\mathbf{x}_i + b) - 1\right],$$

$$Q(\boldsymbol{\alpha}) = \sum_{i=1}^{P}\alpha_i - \frac{1}{2}\sum_{i=1}^{P}\sum_{j=1}^{P}\alpha_i\alpha_j d_i d_j\mathbf{x}_i^T\mathbf{x}_j,$$

$$\mathbf{w}^* = \sum_{i=1}^{P_s}\alpha_i^* d_i\mathbf{x}_i \qquad y(\mathbf{x}) = \mathrm{sign}\left[\sum_{i=1}^{P}\alpha_i^* d_i\mathbf{x}_i^T\mathbf{x} + b^*\right]$$