## 1.1 Libertine

THEOREM 1.1—RESIDUE THEOREM

Let $f$ be analytic in the region $G$ except for the isolated singularities $a_1, a_2, \dots, a_m$. If $\gamma$ is a closed rectifiable curve in $G$ which does not pass through any of the points $a_k$ and if $\gamma \approx 0$ in $G$ then

$$\mathop{\mathrm{Res}}\limits_{z=a}f(z) = \mathop{\mathrm{Res}}\limits_a f = \frac{1}{2\pi\mathrm{i}} \int\limits_C f(z)\,\mathrm{d}z = \frac{1}{2\pi i}\int_\gamma f = \sum_{k=1}^m n(\gamma;a_k) \text{Res}(f;a_k)$$

where $C \subset D\backslash\{a\}$ is a closed line $n(C, a) = 1$ (e. g. a counterclockwise circle loop).□

### Some bold math

If the radio channel is modeled as an LTV system, the observed noisy signal $\boldsymbol{y}(t)$ will be

$$\boldsymbol{y}(t) = \int_0^\infty \mathrm{H}(t,\tau)\boldsymbol{u}(t-\tau)\,d\tau + \boldsymbol{e}(t), \tag{1.1}$$

where $t$ is the time when the receive antenna observes the signal, $\tau$ is the time delay in the channel, and $\boldsymbol{e}(t) \sim \mathcal{CN}(0, \Sigma)$ is additive zero mean circular symmetric complex Gaussian noise with a positive definite covariance matrix $\Sigma \in \mathbb{R}^{n_x \times n_x}$. The probability density function of the distribution is given by

$$\mathcal{CN}(\boldsymbol{x}|\boldsymbol{m}, \Sigma) = \frac{1}{\pi^{n_x}|\Sigma|} \exp\{-(\boldsymbol{x}-\boldsymbol{m})^*\Sigma^{-1}(\boldsymbol{x}-\boldsymbol{m})\}, \tag{1.2}$$

where $\boldsymbol{m} \in \mathbb{C}^{n_x}$ denotes the mean, $\boldsymbol{x} \in \mathbb{C}^{n_x}$ denotes the random variable, $(\cdot)^*$ denotes Hermitian transpose, and $|\cdot|$ denotes determinant.

### Verbatim and ttfont

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    \sum_{k=1}^m n(\gamma;a_k) \text{Res}(f;a_k)
\]
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