

# Øving 12

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November 8, 2020

Exercises are from American version of Kreyszig (google "Advanced Engineering Mathematics")

## 16.1

### 16.1.8

Expand the function in a Laurent series that converges for  $0 < |z| < R$  and determine the region of convergence for

$$\frac{e^z}{z^2 - z^3}. \quad (1)$$

### 16.1.14

Find the Laurent series that converges for  $0 < |z - z_0| < R$  and determine the region of convergence for

$$\frac{e^{az}}{z - z_0}. \quad (2)$$

### 16.1.23

Find all Taylor and Laurent series with center  $z_0 = 0$  and determine the region of convergence for

$$\frac{z^8}{1 - z^4}. \quad (3)$$

## 16.2

### 16.2.4

Determine the location and order of the zeros of

$$\tan^2(2z). \quad (4)$$

### 16.2.14

Determine the singularities, including those at infinity, and state the order of the poles for

$$e^{z-i} + \frac{2}{z-i} - \frac{8}{(z-i)^3}. \quad (5)$$

### 16.3

#### 16.3.4

Find all the singularities in the finite plane and the corresponding residues of

$$\frac{\cos(z)}{z^4}. \quad (6)$$

#### 16.3.8

Find all the singularities in the finite plane and the corresponding residues of

$$\frac{8}{(z^2 - 1)^2}. \quad (7)$$

#### 16.3.9

Find all the singularities in the finite plane and the corresponding residues of

$$\frac{1}{1 - e^z}. \quad (8)$$