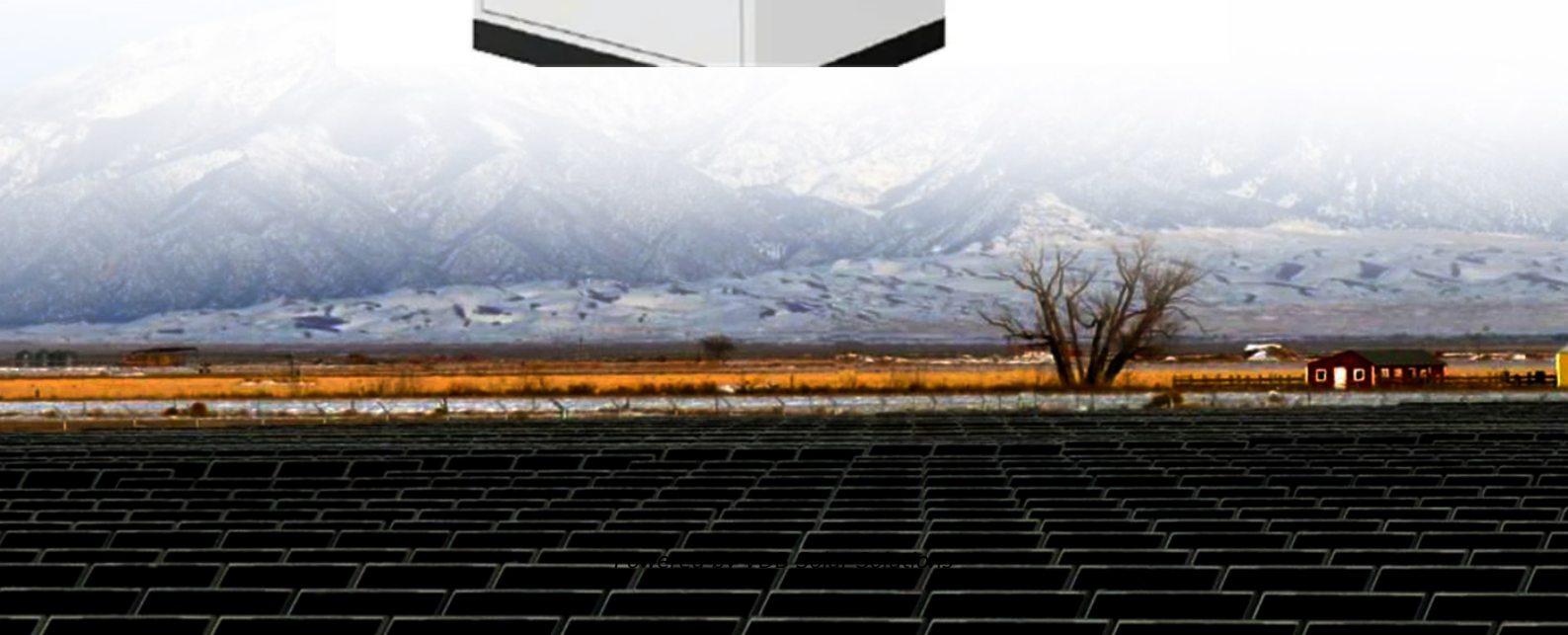


# **Electric machinery and power systems fundamentals pdf**





## Overview

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What is the series impedance of a 3 phase transformer?

The series impedance of a 20,000 kVA, 110/13.8 kV, Y- $\Delta$  three phase transformer is  $0.02 + j0.08$  pu. To find the per-unit impedance in a power system with a base apparent power of 500 MVA and a base voltage on the high side of 120 kV, you would apply the transformation formula.

What is the phase impedance of load 1 and load 2?

Load 1 is Y-connected with a phase impedance of  $2.5 \angle 36.87^\circ \Omega$  and load 2 is  $\Delta$ -connected with a phase impedance of  $5 \angle -20^\circ \Omega$ . The text further discusses finding the line voltage of the two loads, voltage drop on the transmission lines, and real and reactive powers supplied to each load.

What is the efficiency of a power system?

The efficiency of the power system in the given example is 97.4%. The power supplied by the source is 92.37 kW, and the output power is 90 kW.

What is the voltage regulation of a transformer?

The voltage regulation of the transformer is 0.6%, calculated as  $VR = (2314 \text{ V} - 2300 \text{ V}) / 2300 \text{ V} \times 100\%$ . The power supplied to the load is 90 kW.

What is the primary line voltage of a transformer bank?

(c) The primary line voltage of this transformer bank is assumed to be a constant 13.8 kV. Plot the secondary line voltage as a function of load current for currents from no-load to full-load. Repeat this process for power factors of 0.85 lagging, 1.0, and 0.85 leading.

What is the power input for a lossless motor?

If this motor is assumed lossless, then the input power is equal to the output power. The input power to this motor is 66.5 kW. Since this motor is assumed



to be lossless, the output power is equal to the input power.



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3 The flux density on the right side of the core is ( ) ( ) 0.005 Wb 2.0 T 0.05 m 0.05 m B A ? == = 1-6. A ferromagnetic core with a relative permeability of 1500 is shown in Figure P1-3. The dimensions are as shown in the diagram, and the depth of the core is 7 cm.

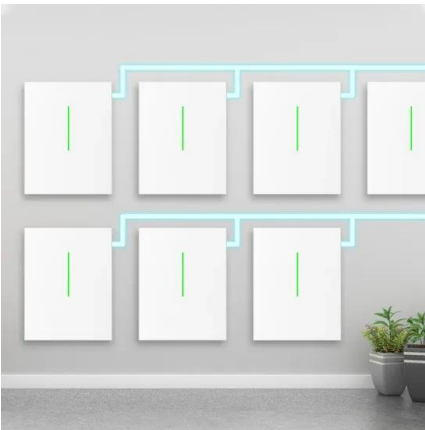
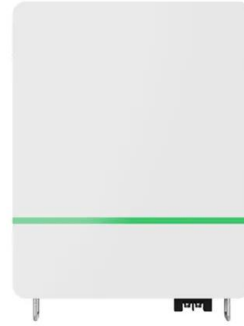


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