JNTUK Online Examinations[Mid1-PSOC]

Minimum active power generation of a generator is limited by **flame instability**

Maximum reactive power generation of a generator is limited by **rotor over heating**

The unit of incremental fuel rate of a gnerator is **million Btu per hour / MW**

If the incremental fuel rate of a genrator is 0.1 million Btu per hr/MW, then the incremental efficiency is **10 MW / million Btu per hr**

Five generators are meeting the total load. At optimal operation point incremental fuel cost of generator 1 is Rs.100 per MWhr then the incremental fuel cost of generator 5 is **Rs.100 per Mwhr**

Ten generators together meeting the total load of 2,500 Mw, At optimal operation point incremental fuel cost of generator 3 is Rs.50 per Mwhr. then the incremental fuel cost of generator 10 is **Rs.50 per Mwhr**

If PL = are **source loadings**

If is **transmission loss coefficient**

Incremetnal transmission loss in terms of loss Coefficients is given by

In loss coefficient matrix the diagonal elements are **all positive**

In a power system with two generators and large number of loads the loss coefficient B11 is given by

The off diagonal element Bmn of loss coefficient matrix is given by

In a n bus system if the branch resistances are increased transmission loss**increases**

In a n bus system if power factors are decreased then the transmission loss **increases**

The power balance equation of hydro thermal power plant at time f is given by

In a hydro thermal system if thermal generation decreased keeping load demand constant, then the hydro generation **increases**

As thermal generation increases the cost of thermal generation **increases**

As hydro generation decreases the cost of hydro generation **decreases**

As head increases then hydro generation **increases**

In a turbine low power level pilot valve movement is converted into high power level pistion valve movement using **hydraulic amplifier**

In a turbine provides a movement to the control valve in proportion to change in speed **linkage mechanism**

Synchronous machine can be modelled using Two-axises. The two axises are **d - g**

The unit of inertia constant (H) of a synchronous machine is **mega joules / mega volt ampers**

The swing equation is given by

The transfer function of speed control mechanism is defined as Gsc(s) =

(s) is **Laplace transform of change in governor position**

The stabilizing transformer is present in **Brush less excitation scheme**

The effect of saturation is included in**IEEE Type-I excitation system**

For economic operation, the generator with highest positive incremental transmission loss will operate at**the lowest positive incremental cost of production**

The economic load dispatch problem involves the solution of two different problems, the first one is unit commitment and the second one is **on line economic dispatch**

Broadly the constraints are classified into types

two

Inequality constraints are of types**two**

Hard type constraints are constraints**inequality**

Minimum reactive power generation of a generator is limited by**stability limit of the machine**

Generator inequality KVA constraint is given by where, cp is generator capacity**Generator active power inequality constraint is given by Ppmin ≤ Pp ≤ Ppmax**

Generator reaactive power inequality constraint is given by **Qpmin ≤ Qp ≤ Qpmax**

Cost curve is plotted between**operating cost Vs power output**

In economic load dispatch, inequality voltage, constraint is given by where

bus

In economic load dispatch, Inequality voltage phase angle constraint is given by where

δp is phase angle at the Pth bus**δpmin ≤ δp ≤ δpmax**

Incremental fuel rate is defined as**change in input / change in output**

As output increases fuel input **increases**

If Cpmax is maximum loading capacity of the pth line, then the transmission line constraint is given by

Cp < Cpmax

If F is fuel input in million Btu per hr and P is the power output in MW if a generator then the

incremental efficiency is given by

The relation between the incremental efficiency and incremental fuel rate of generator is

incremental efficiency =

The auxiliary function of an economic dispatch problem when losses are neglected is given by

If λ1, λ2, λ3 --------------

λn are incremental fuel costs of generators, then the condition for optimum operation is

λ1 = λ2 = λ3 = λ4

-------------- λn

The auxiliary function of an economic dispatch problem taking losses into account is given by

F = FT + λ (PD + PL -)

Condition for optimal load dispatch taking losses into account of n generator system is

, where λ is the **incremental cost of received power**

While deriving loss formula equation, the assumption made is **the power factor of each source is constant**

While deriving loss formula equation the assumption made is **the generator bus voltage magnitudes and angles are constant**

The incremental loss is defined as **the ratio of change in loss to the change in generation**

For an n generator system the loss coefficient matrix is

n × n symmetric matrix

In a power system with two generators and large number of loads the loss coefficient B12

is given by

In a power system with two generators and large number of loads the loss Co-efficient B12

is given by

The assumption made while deriving the transmission loss formula is **the ratio X/R for all transmission lines is same**

The assumption made while deriving the transmission loss formula is **the phase angle of all the load currents is same**

The power balance equation at mth internal of hydro thermal system is given by

The power balance equation of hyderthermal system is given by is **hydro generation in the mth interval**

Water continuity equation of hydro power plant at mth interval is given by

X1m - X1(m-1) - Jm ΔT + qm ΔT=0; in this equation X1m is **water storage at the end of the mth interval**

Water continuity equation of hydro power plant at mth interval is given by

X1m - X1 - JmΔT + qmΔT=0 in this equation Jm is **water inflow in the mth interval**

If PGT (t) is thermal generation at time 't'. Then the cost of thermal (C<sun>T)

generation is given by

The hydro generation PGH (t)is a fucnction of discharge and

water storage

The range of short range hydro-scheduling is **1 day to one week**

The short range hyder-scheduling involves the scheduling of all generation on a system to achieve of all generation on a system to achieve minimum production cost for the given time period **hour by hour**

As input to hydroelectric unit increases it's output power **increases**

As input to hydroelectric unit decreases it's output power **decreases**

The function of speed governor in turbine is **to sense the change in speed**

The function of speed changer in turbine is **to provide a steady state power output setting**

The synchronous machine consists of two major components one is stator the other one is

rotor

The type of the current passing in field winding of synchronous machine is **D.C**

If θm is mechanical angle and P is no.of poles in a synchronous machine then electrical angle (θe) is equal to

If Tm and Te are mechanical & electrical torque of a synchronous machine, then the accelerating torque (Ta) is given by **Tm -Te**

If No = Speed at no load, Nr = Rated speed and N = Speed at rated load of a synchronous machine, then the steady state speed regulation is given by

The unit of steady state speed regulaltion is

H2 / Mw

In generator with uncontrolled field current the open circuit emf for slow changes in load power**remains constant**

In generator with uncontrolled field current as load power increases it's terminal voltage

decreases

By controlling the field current the synchronous generator powe can be raised to **30 - 60%**

The terminal voltage of a synchronous generator is given by E = Eo (1-KP), where

Eo is **no load terminal voltage**

The terminal voltage of a synchronous machine is given by E = Eo (1-KP), where K is**coefficient of regulation**

Soft type constraints are constrain **inequality**

Basic load flow equations are constraints**equality**

The maximum active power generation of a generator is limited by **thermal limit**

Unit of the power output is **MW**

Unit for operating cost of the generator is **Rs/hr**

In economic load dispatch problem, transmission line losses are calculated, using B - Coefficients

If F is the fuel input in million Btu per hr and P is the power output in MW, then the incremental fuel rate is given

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The unit of fuel input to the generator is

million B tu per hr

The unit of output power of a gnerator is **MW**

If F1, F2, F3 --------------- Fn are fuel inputs to & F1, F2 --------------- Fn are outputs of the generator the generators then the condition for most economic operation is

The unit of incremental production cost of plant is **Rs.per MW hr**

If Pm and Pn are the source loadings and Bmn is the transmission loss coefficients, then the loss formula equation is given by

The unit of incremental transmission loss is**No unit**

The unit of transmissionl loss coefficient is **MW hr-1**

When transmission losses are included for economic load dispatch solution **the individual generators will operate at different incremental costs of production**

When transmission losses are included for economic load dispatch solution, the generator with highest positive incremental transmission loss will operate at the incremental cost of production

lowest

In a power system with two generators and large number of loads the loss coefficient B22

is given by

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The diagonal lelement (Bnn) of loss coefficient matrx is given by

Transmission line loss is **inversely proportional to square of the voltage**

In a two bus system if the bus power is increased then the transmission line loss**increases**

The power balance equation of hyderthermal system is given by is

transmission loss in the mth interval

In hydrothermal system the operating costs of the plants is such that**hydro plants cost is much smaller**

than thermal plants

Water continuity equation of hydro power plant at mth interval is given by

X1m - X1(m-1) - JmΔT + qmΔT=0 in this equation qm is **water discharge in the mth**

interval

In a hydro thermal system if hydro generation is increased keeping load demand constant, then the

thermal generation **decreases**

The hydero genration PGH (t) is a function of nnd water storage

discharge

As rate of discharge of water increases the hydro generation **increases**

The objective function of short-term hyderthermal scheduling is

In short term hydro-scheduling problem, the storage limits are **Vmin ≤ V; ≤ Vmax**

The hydro station discharge flow constraints are

qmin ≤ q; ≤ qmax

Which one of the following is not a component of turbine speed governing system **excitation system**

As turbine speed increases the fly balls **move outwards**

The type of the current passing in stator winding of synchronous machine is **Normal frequency A.C**

In synchronous machine the stator carries **armature winding**

The angular momentum (M) of a synchronous machine is given by

The unit of angular momentum (M) of a synchronous machine is **mega joule -sec/elec**

degree

As output power decreases steady state speed regulation **decreases**

Transfer function of the speed control mechanism is given by

In synchronous generator as terminal voltage decreases it's excitation should , to maintain

constant voltage **increase**

The excitor ceiling voltage is defined as **the maximum voltage that may be attained by an excitor with specific conditions of load**

Thyristors are used in **Static excitation scheme**