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Wageningen B-series open water propeller performance charts, and propeller performance behind ship

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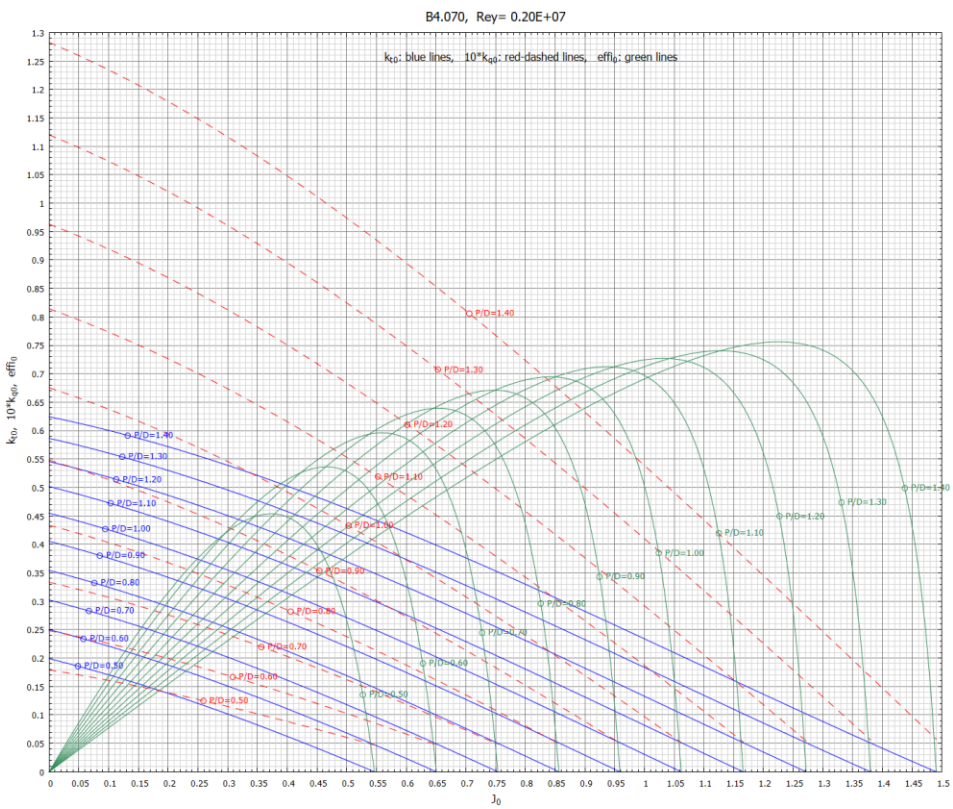

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Sunday, September 17, 2023

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1. Wageningen B-series and the contents of this volume

Wageningen B-series open-water propeller thrust and torque coefficients, k_{t0}, k_{q0}, have been presented by [Oostérveld and Oossanen, 1975], in polynomial regression form, in terms of $J_0, \frac{P}{D}, z, \frac{A_E}{A_0}$, where J_0 is the open-water advance coefficient, $\frac{P}{D}$ is the pitch ratio, z is the number of blades and $\frac{A_E}{A_0}$ is the expanded blade area ratio.

In the same paper, Reynolds corrections are also separately included, in a polynomial regression form, in terms of $J_0, \frac{P}{D}, z, \frac{A_E}{A_0}, \mathrm{Re}_{0.75}$, where $\mathrm{Re}_{0.75}$ is the Reynolds number at the equivalent radius $\frac{r}{R} = 0.75$, given by the following equation:

$$\mathrm{Re}_{0.75} = \frac{c_{0.75} V_{0.75R}}{\nu} \tag{1}$$

where:

$V_{0.75R}$ is the undisturbed fluid velocity at the equivalent radius $r = 0.75R$:

$$V_{0.75R} = nD\sqrt{J_0^2 + (0.75\pi)^2} = \frac{V_0}{J_0}\sqrt{J_0^2 + (0.75\pi)^2} \tag{2}$$

$c_{0.75}$ is the chord of the blade section at $r = 0.75R$, which for B-series is given by:

z=3: $$\frac{c_{0.75R}}{D}\frac{z}{A_E/A_0} = \frac{2.168 + 2.127}{2} \Rightarrow c_{0.75R} = 2.1475\frac{D}{z}\frac{A_E}{A_0} \tag{3}$$

z=4,5,6,7: $$\frac{c_{0.75R}}{D}\frac{z}{A_E/A_0} = \frac{2.144 + 1.97}{2} \Rightarrow c_{0.75R} = 2.057\frac{D}{z}\frac{A_E}{A_0} \tag{4}$$

and ν denotes the kinematic viscosity.

The regression limits of the polynomials for k_{t0}, k_{q0} are as follows [Oostérveld and Oossanen, 1975]:

z=3: $0.35 \le \frac{A_E}{A_0} \le 0.80$, z=4: $0.40 \le \frac{A_E}{A_0} \le 1.00$, z=5: $0.45 \le \frac{A_E}{A_0} \le 1.05$,

z=6: $0.50 \le \frac{A_E}{A_0} \le 0.80$, z=7: $0.55 \le \frac{A_E}{A_0} \le 0.85$

In this volume we present the values of $k_{t0}(J_0, \frac{P}{D})$, $k_{q0}(J_0, \frac{P}{D})$ for all combinations of:

z =3 to 7, $\frac{A_E}{A_0}$ =0.4 to 1.05 step 0.05 and for $\mathrm{Re}_{0.75}$ =2*10^6, 2*10^7, 2*10^8, 2*10^9.

The above ranges for $z, \frac{A_E}{A_0}$ occasionally exceed the regression limits of k_{t0}, k_{q0}, but we decided to include them for informative/comparative purposes. **However, be aware that using out of range values for $z, \frac{A_E}{A_0}$, can give erroneous results for k_{t0}, k_{q0}. Therefore, be extremely careful when selecting out of range values for $z, \frac{A_E}{A_0}$.**

2. Connection of the propeller operating behind the ship to that of a propeller operating separate from the ship

As early as 1883, R.E. Froude, after extensive experiments with model propellers behind ship models, and model propellers separate from the ship, found that a propeller behind a ship, rotating at a rotational velocity n, behaves like a propeller separate from the ship, operating at the same rotational velocity n, at a reduced advance velocity $V_0 < V$, called 'effective advance velocity'. He then introduced the 'effective wake fraction' w and the 'relative rotative efficiency' η_R as the factors

relating the two conditions, according to the following equations (**thrust equalization method is assumed,** Taylor's definition of wake fraction w is used in (7)):

$$T_0 = T \tag{5}$$

$$Q_0 = Q \cdot \eta_R \tag{6}$$

$$V_0 = V \cdot (1 - w) \tag{7}$$

where T_0, V_0, Q_0 denote the propeller thrust, effective speed of advance and torque of the propeller operating separate from the ship and T, V, Q the propeller thrust, ship's speed and torque of the propeller operating behind ship.

We use the following notation for the dimensionless variables for the propeller operation **separate from the ship** (open water or free running conditions):

$$J_0 = \frac{V_0}{nD} \text{ : advance coefficient, open-water} \tag{8}$$

$$k_{t0} = \frac{T_0}{\rho n^2 D^4} \text{ : thrust coefficient, open-water} \tag{9}$$

$$k_{q0} = \frac{Q_0}{\rho n^2 D^5} \text{ : torque coefficient, open-water} \tag{10}$$

$$\eta_0 = \frac{T_0 V_0}{2\pi n Q_0} = \frac{J_0}{2\pi} \frac{k_{t0}}{k_{q0}} \text{ : propeller efficiency, open-water} \tag{11}$$

where n is the propeller rotational velocity and D the propeller diameter.

We also use the following notation for the dimensionless variables for the propeller operation **behind ship** (self-propulsion conditions):

$$J = \frac{V}{nD} \text{ : advance coefficient, self-propulsion} \tag{12}$$

$$k_t = \frac{T}{\rho n^2 D^4} \text{ : thrust coefficient, self-propulsion} \tag{13}$$

$$k_q = \frac{Q}{\rho n^2 D^5} = \frac{DHP}{2\pi \rho n^3 D^5} \text{ : torque coefficient, self-propulsion} \tag{14}$$

$$\eta = \frac{TV}{2\pi n Q} = \frac{J}{2\pi}\frac{k_t}{k_q} \text{ : propeller efficiency, self-propulsion} \tag{15}$$

where $DHP = 2\pi n Q$ the delivered horsepower of the propeller operating behind ship.

Due to equations (5) to (7), dimensionless variables for propeller operation separate from ship and behind ship, are related as follows:

$$J_0 = (1-w)J \Leftrightarrow J = \frac{J_0}{(1-w)} \tag{16}$$

$$k_{t0} = k_t \tag{17}$$

$$k_{q0} = \eta_R k_q \Leftrightarrow k_q = \frac{k_{q0}}{\eta_R} \tag{18}$$

$$\eta_0 = \frac{1-w}{\eta_R}\eta \Leftrightarrow \eta = \eta_0 \frac{\eta_R}{1-w} \tag{19}$$

In practical calculations we start by selecting specific values for $z, \frac{A_E}{A_0}, \mathrm{Re}_{0.75}$ and the corresponding graph, as presented in the next pages. More specifically, z is selected using vibration and noise considerations, $\frac{A_E}{A_0}$ is selected from cavitation considerations while $\mathrm{Re}_{0.75}$ requires iterations if initial guess is unsuccessful.

Using the selected graph, we know the dimensionless propeller performance $k_{t0}(J_0, \frac{P}{D})$, $k_{q0}(J_0, \frac{P}{D})$ for the propeller operating separate from the ship. We can then calculate

the dimensionless propeller performance for the propeller behind ship, using equations (16) to (19).

3. Using GNUPLOT to create the k_{t0},k_{q0}-J_0 line plots

All line plots in this volume have been created using the following procedure:

A. A Fortran 90 code is written preparing the proper data file for the **open-source free plotting software GNUPLOT** [Lee Phillips, 2020].

B. A script file is written, in GNUPLOT language, which reads the data file and produces the corresponding line plot.

4. Useful units and conversion factors

1 m = 3.28084 feet

1 nautical mile = 1.852 kilometers

1 nautical mile = 6078 ft

1 mile = 1.609344 kilometers

1 mile = 5280 ft

1 knot = 1 nautical mile / hour = 1.85184 kilometers/hour = 0.5144 m/s

1 kp (or Kgf) = 9.80665 Newton, $N \equiv \frac{kg \cdot m}{s^2}$

1 kg = 2.20462 lb (or pounds)

1 watt = 1 N m/s

1 Kwatt = 101.9716 kp m/s

1 Kwatt = 1.359621 PS (or Metric Horsepower),

1 PS = 735.49875 watt

1 Kwatt = 1.341022 HP (or British Horsepower, 1 HP=550 lbf ft/s),

1 HP = 745.69987 watt

1 PS = 75 kp m/s

1 atm (or atmosphere) = 101.325 kpa (or kilopascal), 1 pa = 1 N/m^2

1 atm = 1.01325 bar

1 atm = 101325 $\frac{dyn}{cm^2}$

1 atm = 10332.2745 $\frac{kp}{m^2}$

1 atm = 10.33255 meters of water '4 deg C'

$$1\frac{kg}{m^3} = 1\frac{\frac{N}{m/s^2}}{m^3} = 1\frac{Ns^2}{m^4} = \frac{1}{9.80665}\frac{Kp\cdot s^2}{m^4} = 0.10197\frac{Kp\cdot s^2}{m^4}$$

$$\rho_{fresh_water,15^0} = 999\frac{kg}{m^3} = 101.8696\frac{kp\cdot s^2}{m^4}$$

$$\rho_{salt_water,15^0,salinity3.5\%} = 1025.9\frac{kg}{m^3} = 104.6127\frac{kp\cdot s^2}{m^4}$$

$$\nu_{fresh_water,15^0} = 1.13902\cdot 10^{-6}\frac{m^2}{s}$$

$$\nu_{salt_water,15^0,salinity3.5\%} = 1.18831\cdot 10^{-6}\frac{m^2}{s}$$

$$p_{v,15^0} = 1700Pa = \frac{1700}{9.80665}\frac{kp}{m^2} = 173.35\frac{kp}{m^2} \qquad (Pa \equiv \frac{Nt}{m^2},\quad g = 9.80665\frac{m^2}{s})$$

$$p_a = 101325Pa = \frac{101325}{9.80665}\frac{kp}{m^2} = 10332.27\frac{kp}{m^2}$$

5. References

M.W.C. Oostérveld and P. Van Oossanen, Further Computer-Analysed Data of The Wageningen B-Screw Series. ISP Vol 22 – No 251 -1975.

Lee Phillips, Gnuplot 5, Alogus Publishing, Second Edition, 2020.

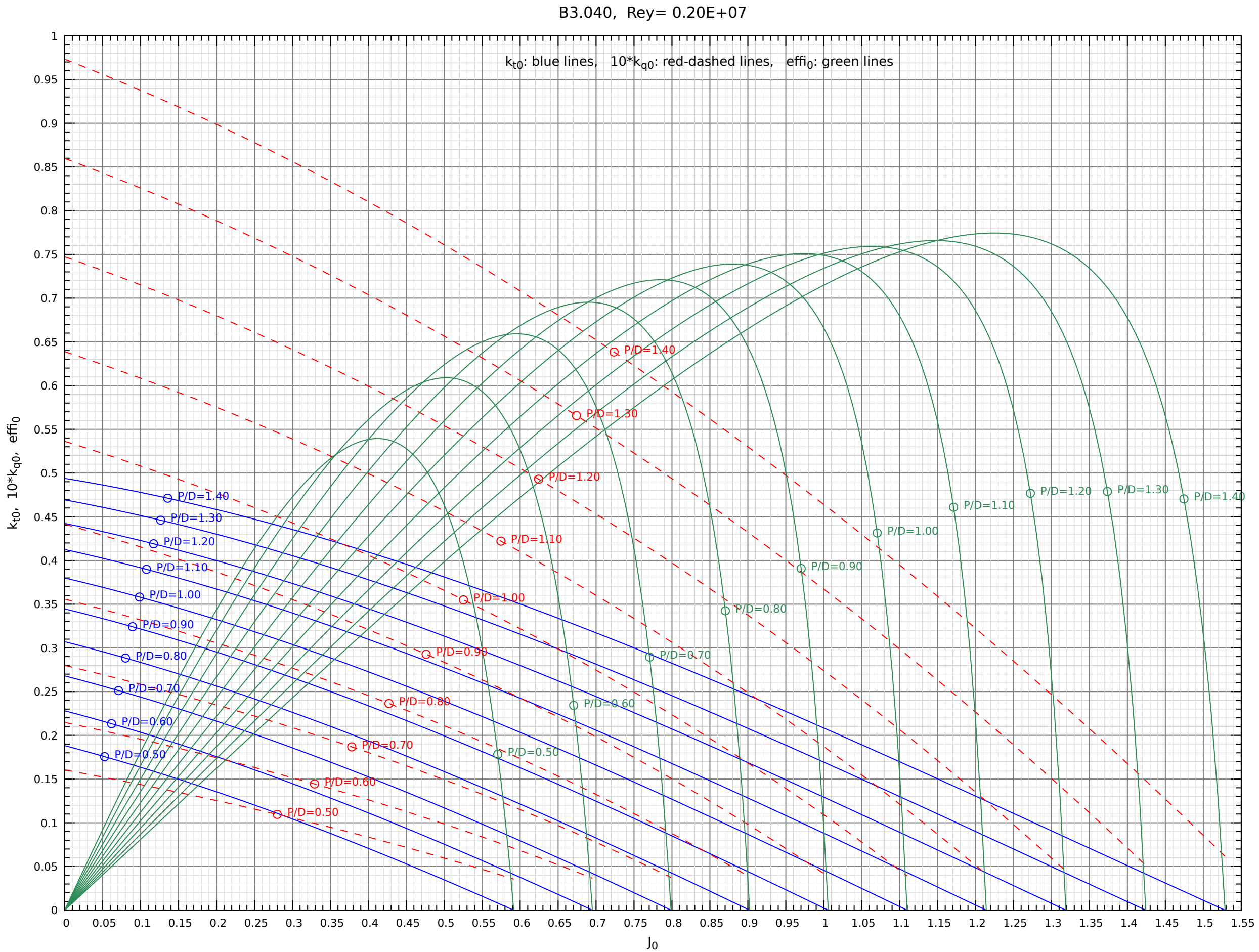
6. B-series k_{t0}, k_{q0}, η_0 - J_0

Parameter ranges:

z=3 to 7

AE/A0=0.4 to 1.05 step 0.05

Re 75%R =$2*10^6$, $2*10^7$, $2*10^8$, $2*10^9$.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J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
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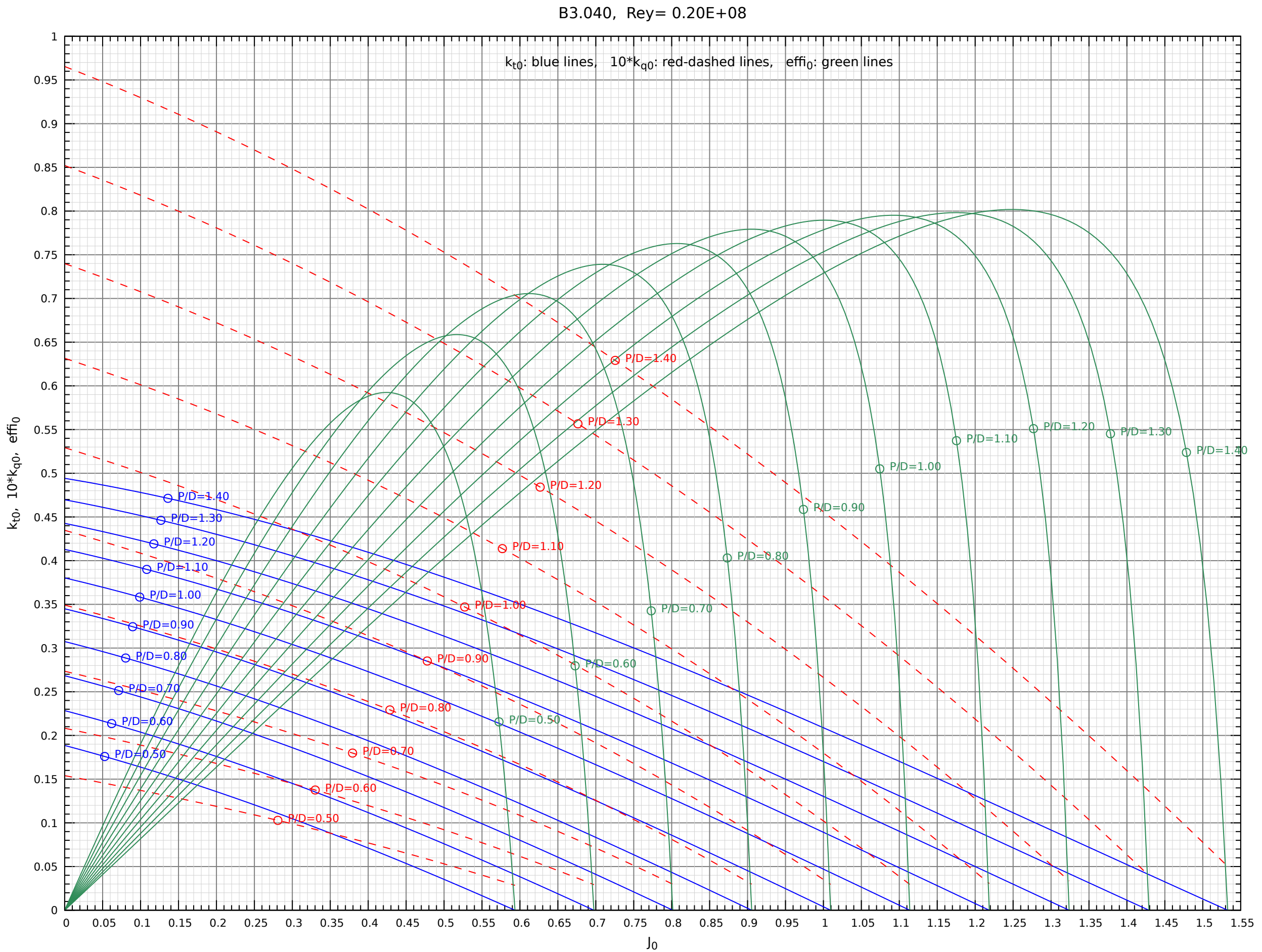
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J_0
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P/D=1.30
P/D=1.20
P/D=1.10
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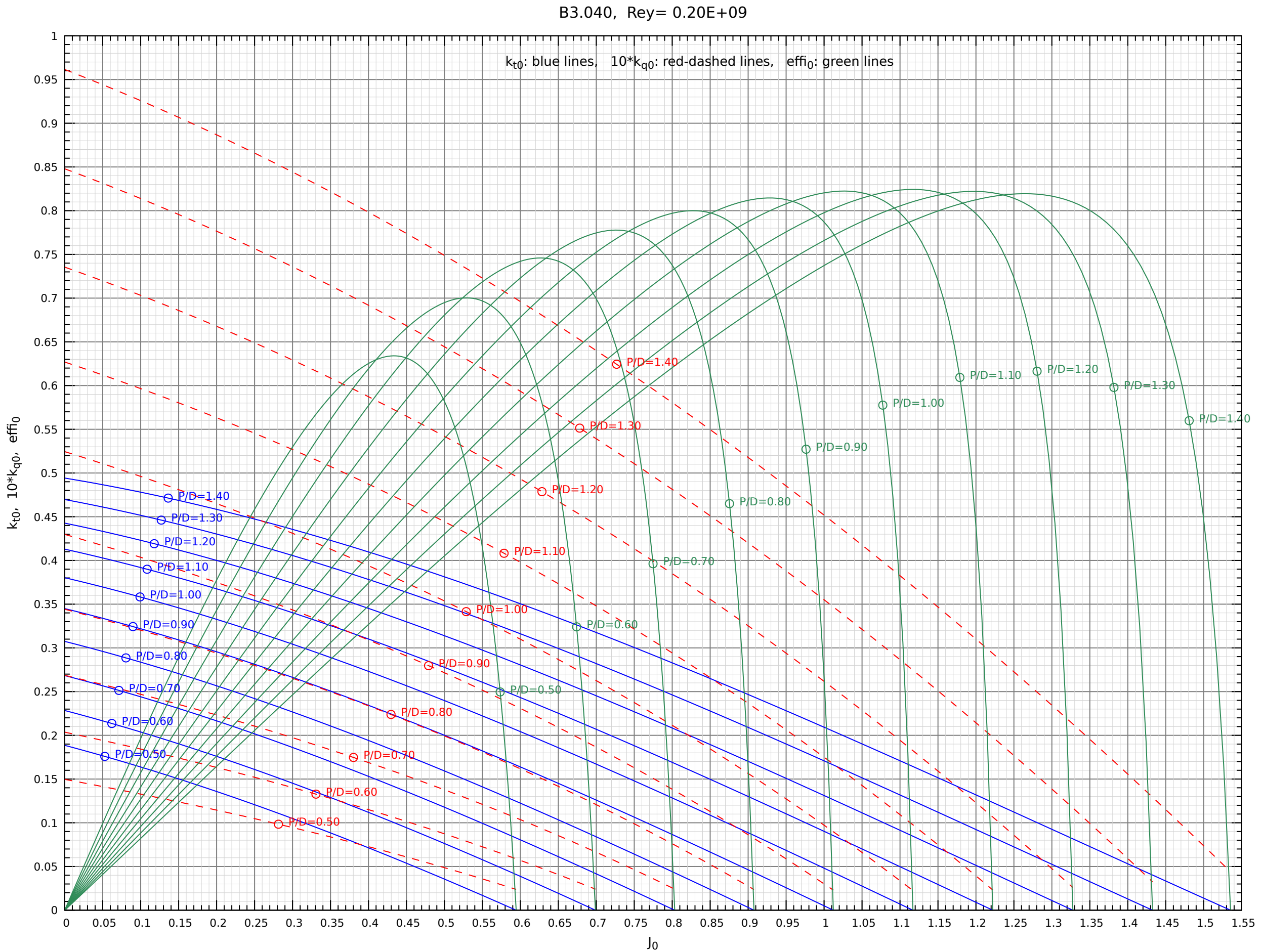
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
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P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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P/D=0.50

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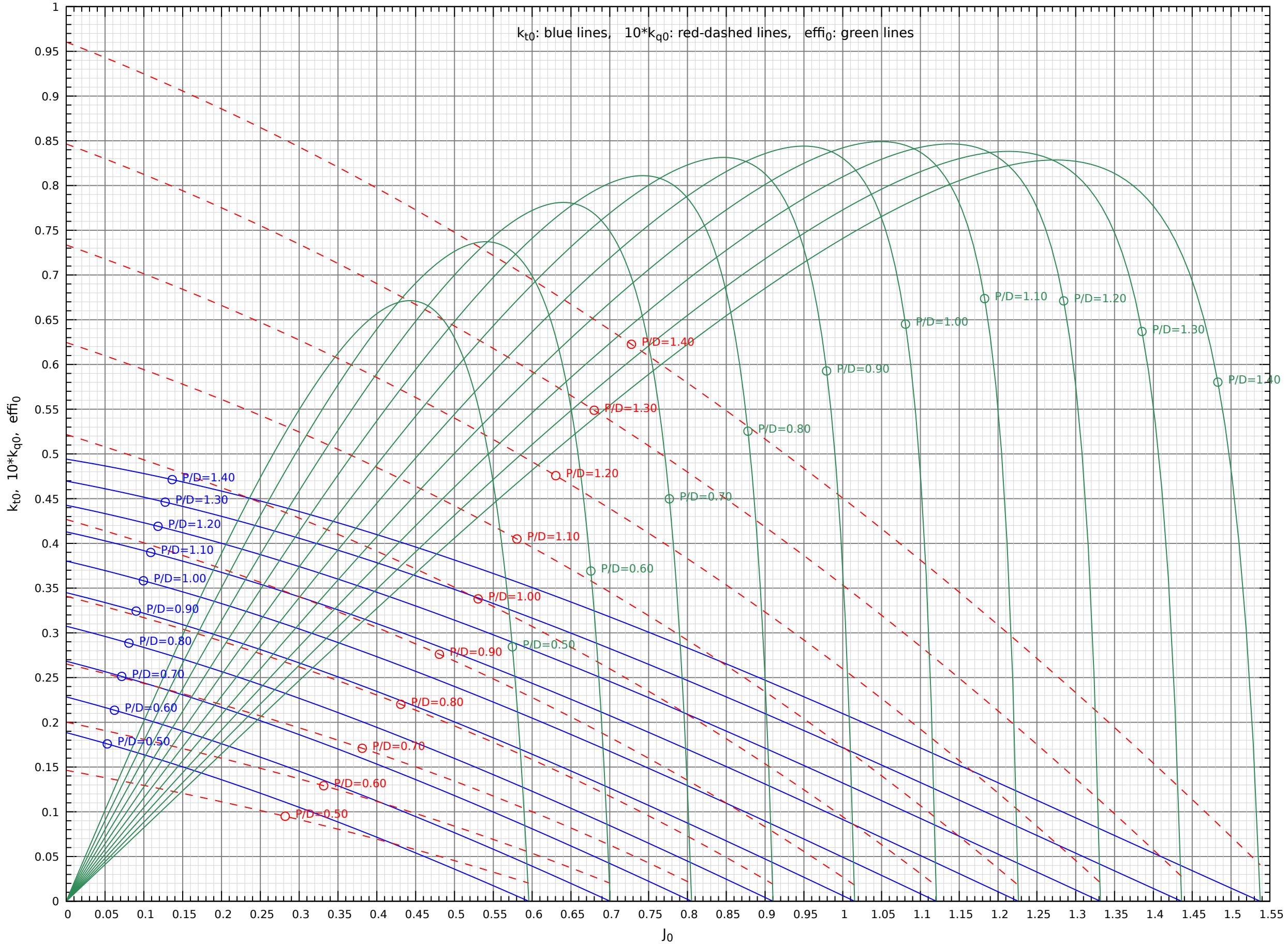

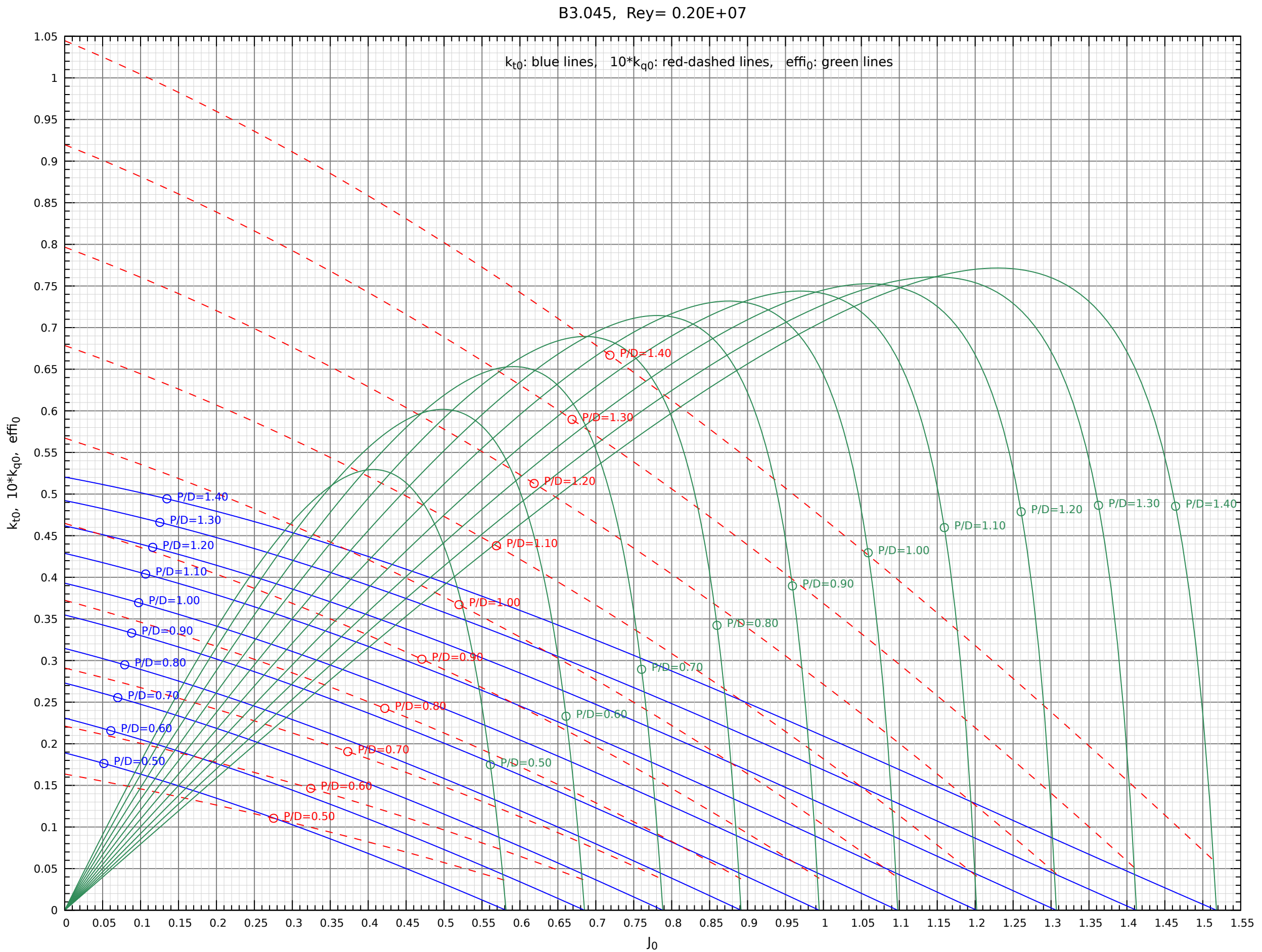
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J_0
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P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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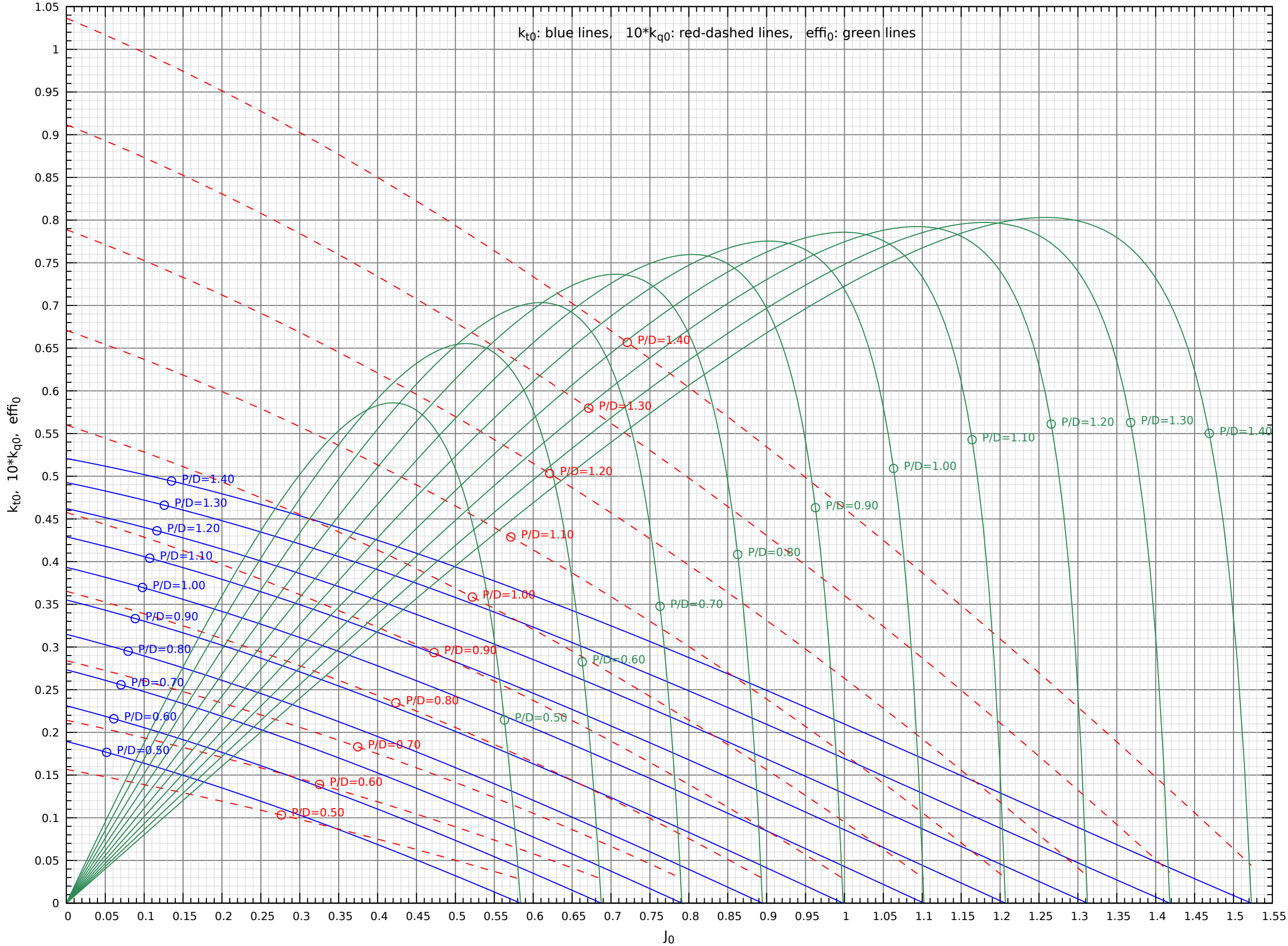

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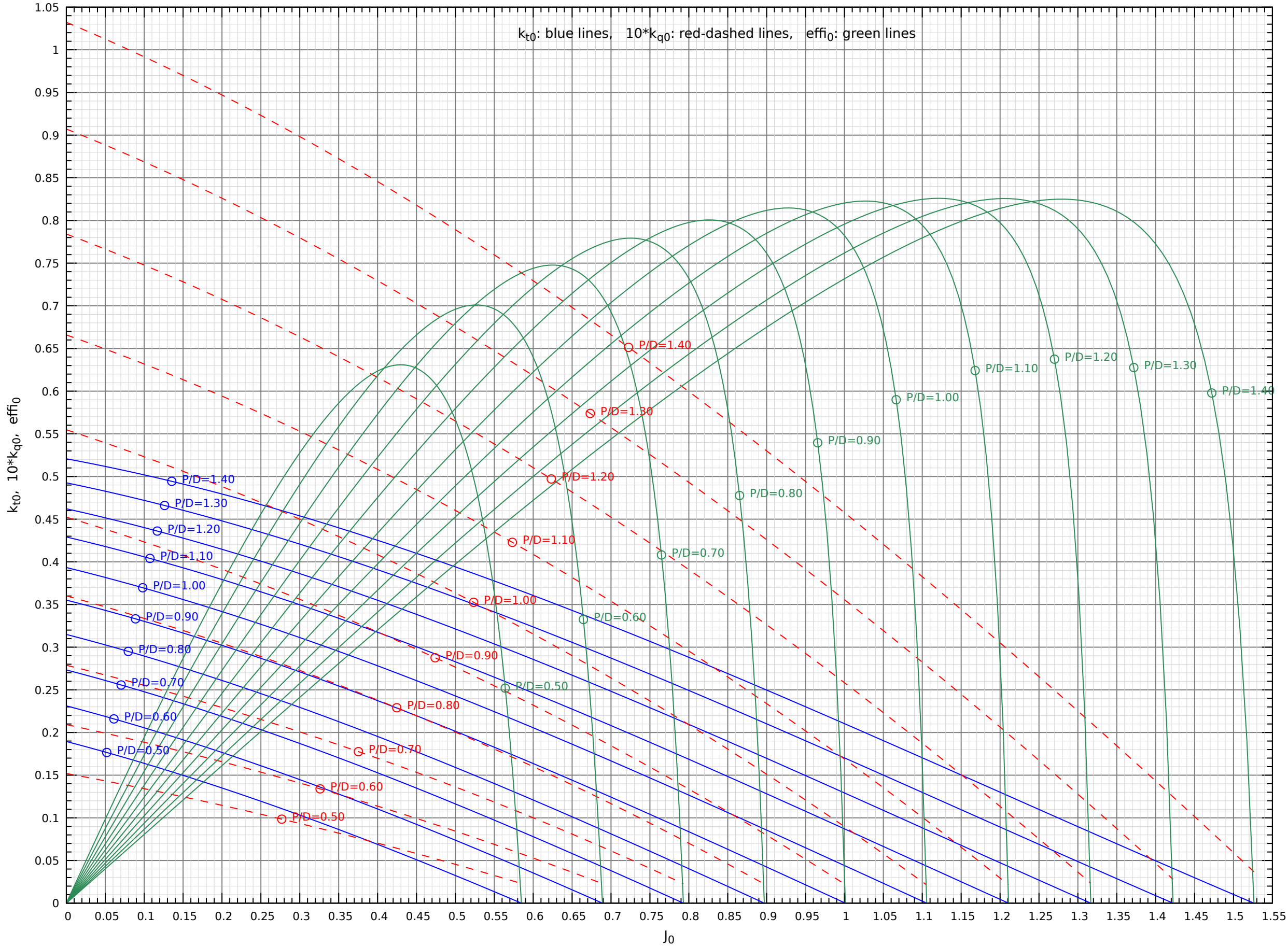

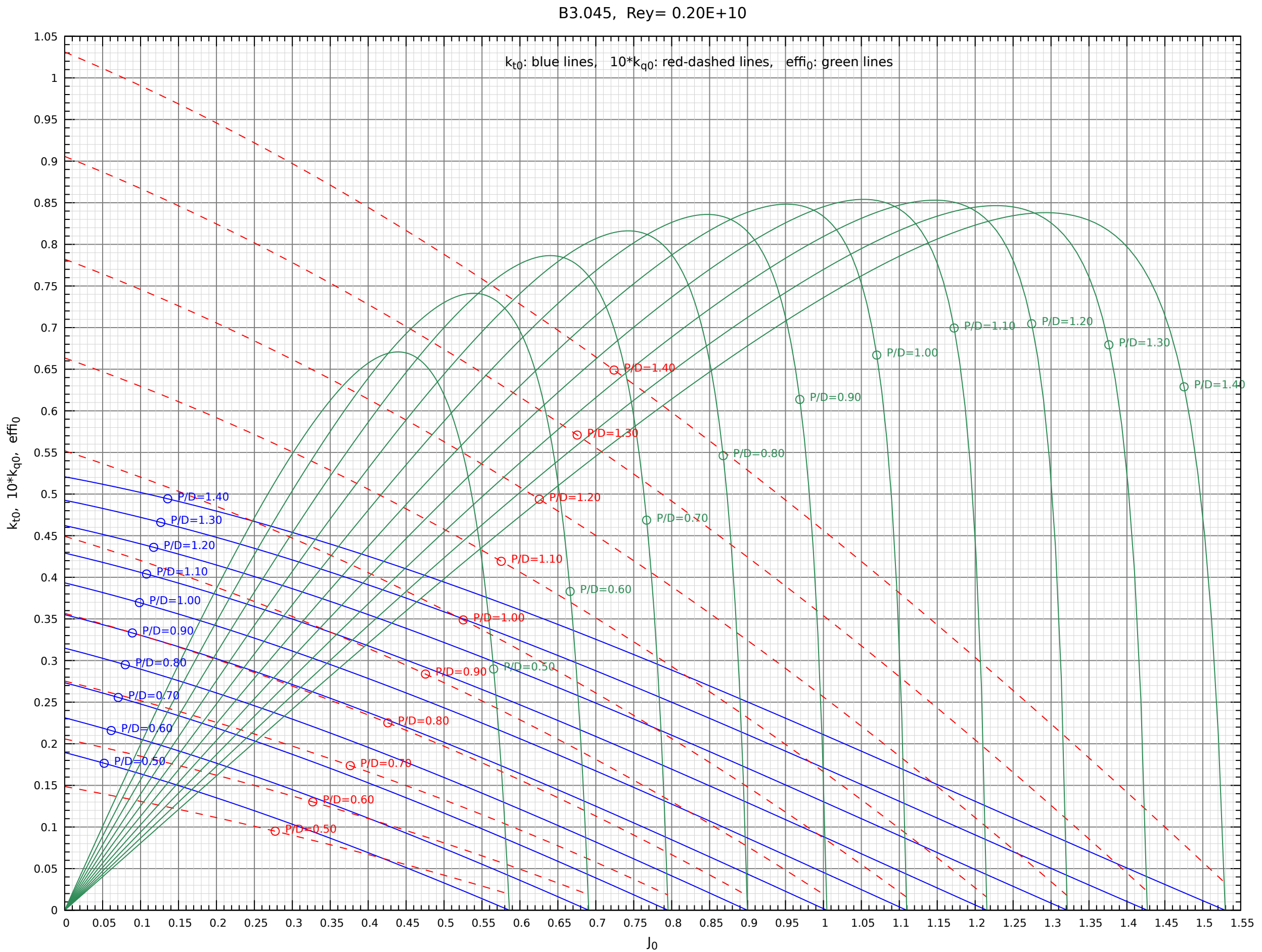
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J_0
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P/D=1.30
P/D=1.20
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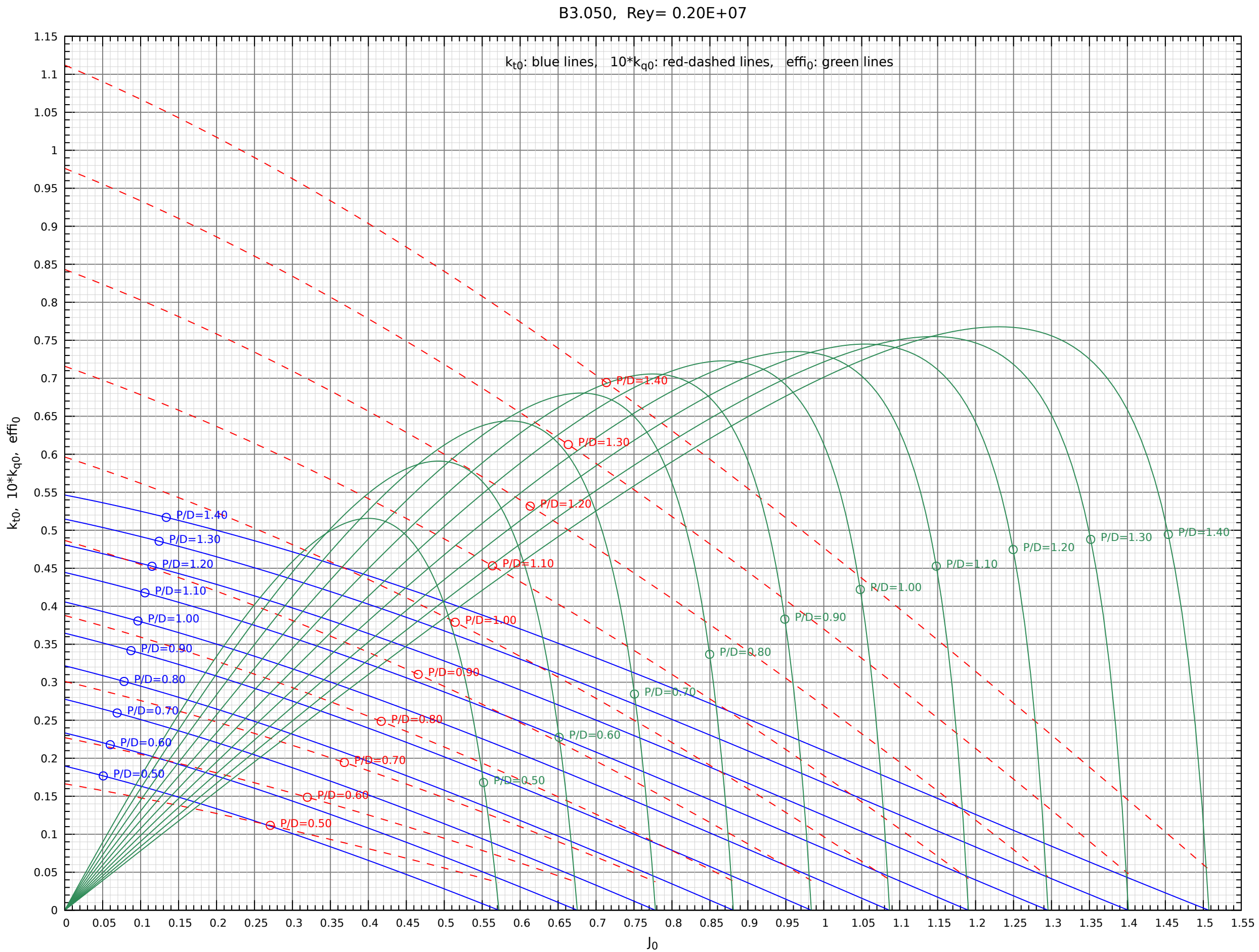
P/D=0.50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P/D=0.50

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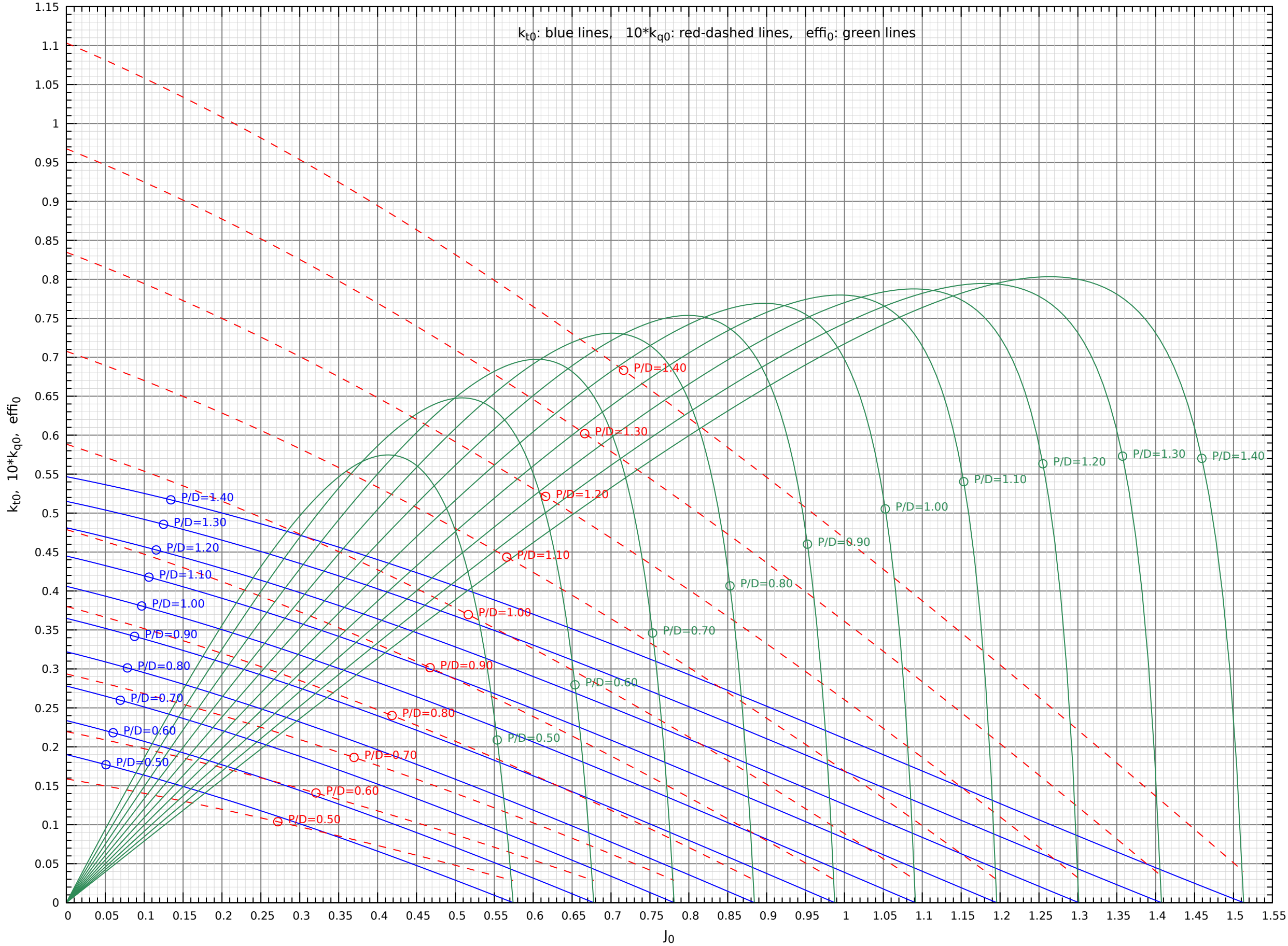

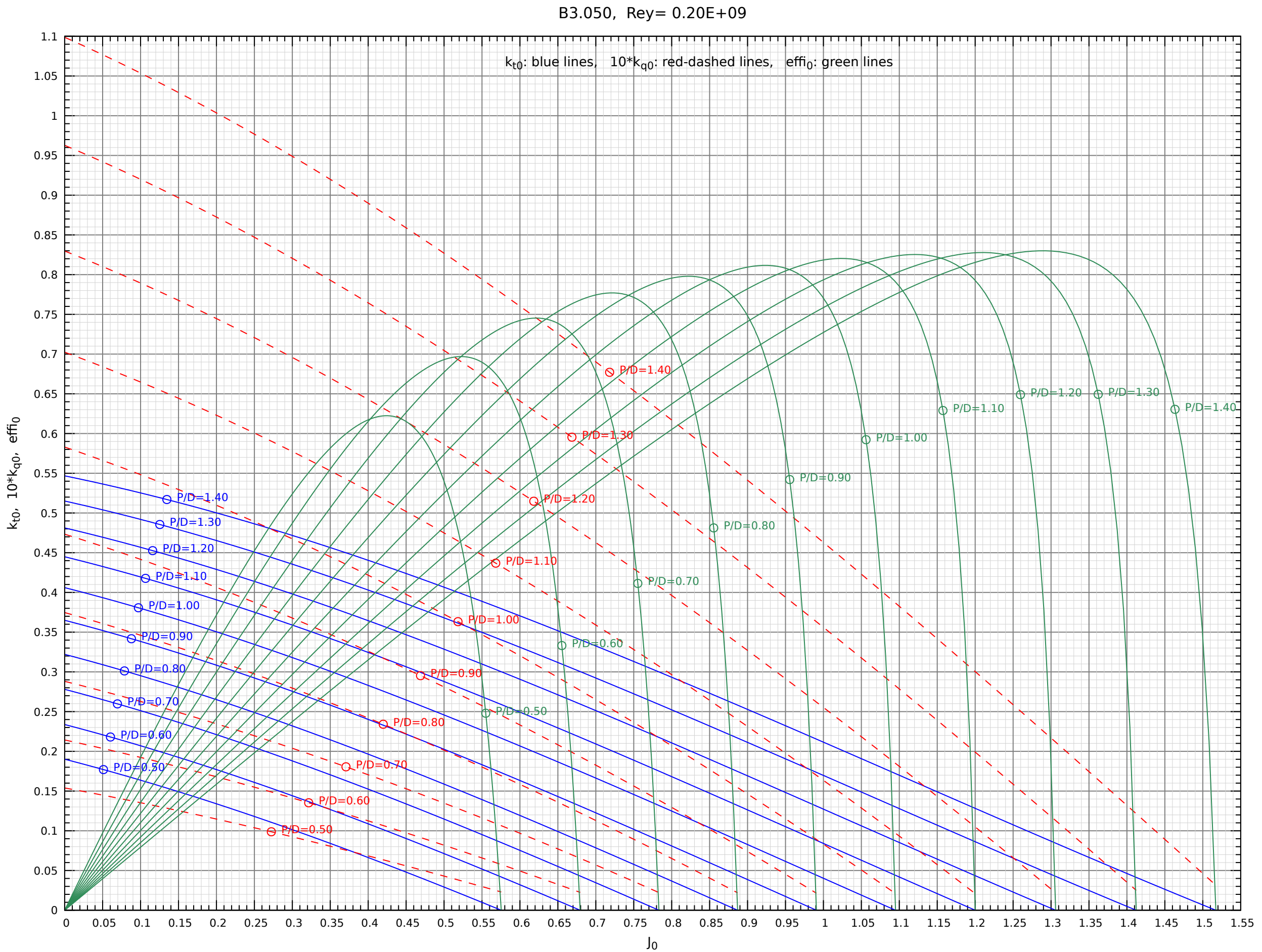
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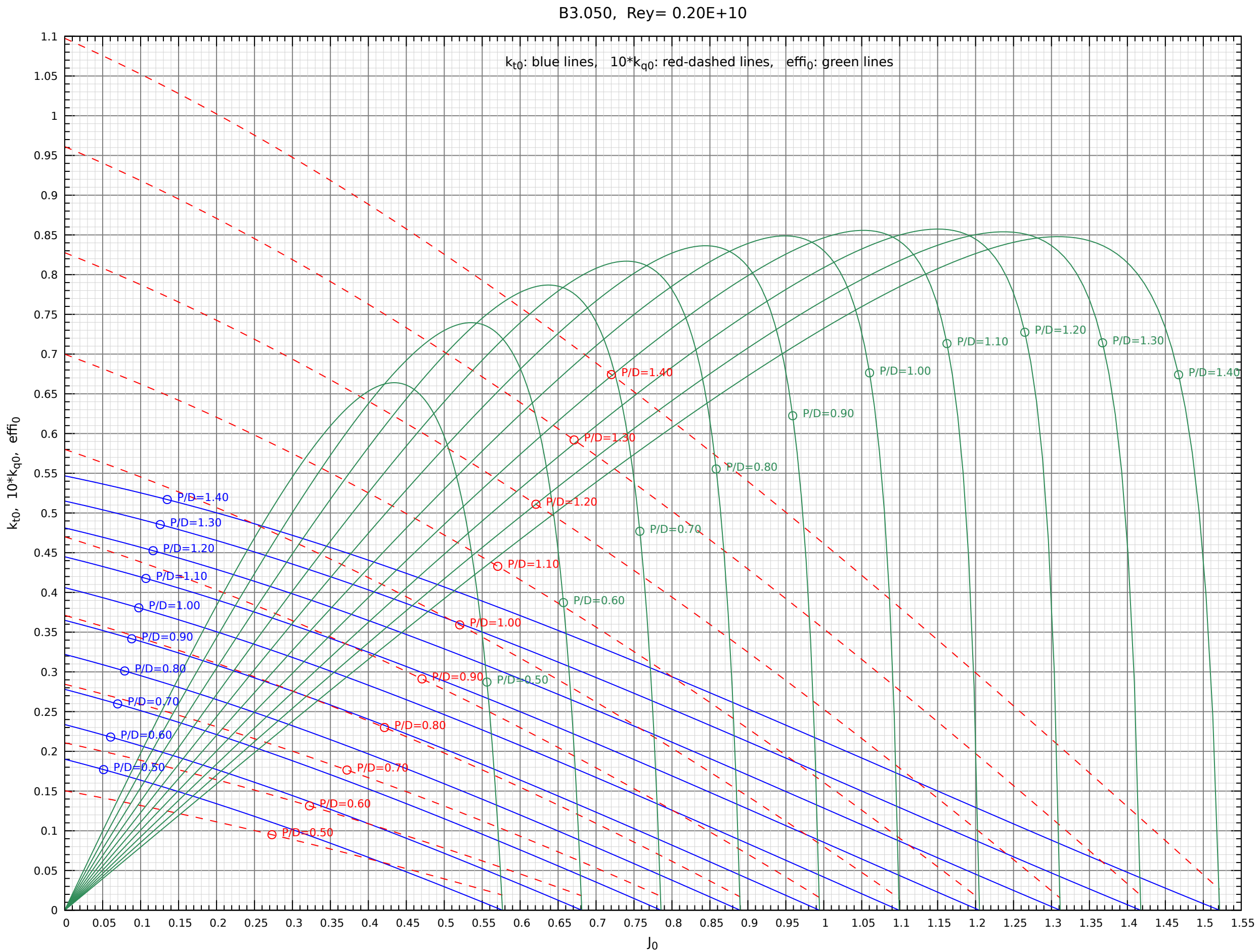
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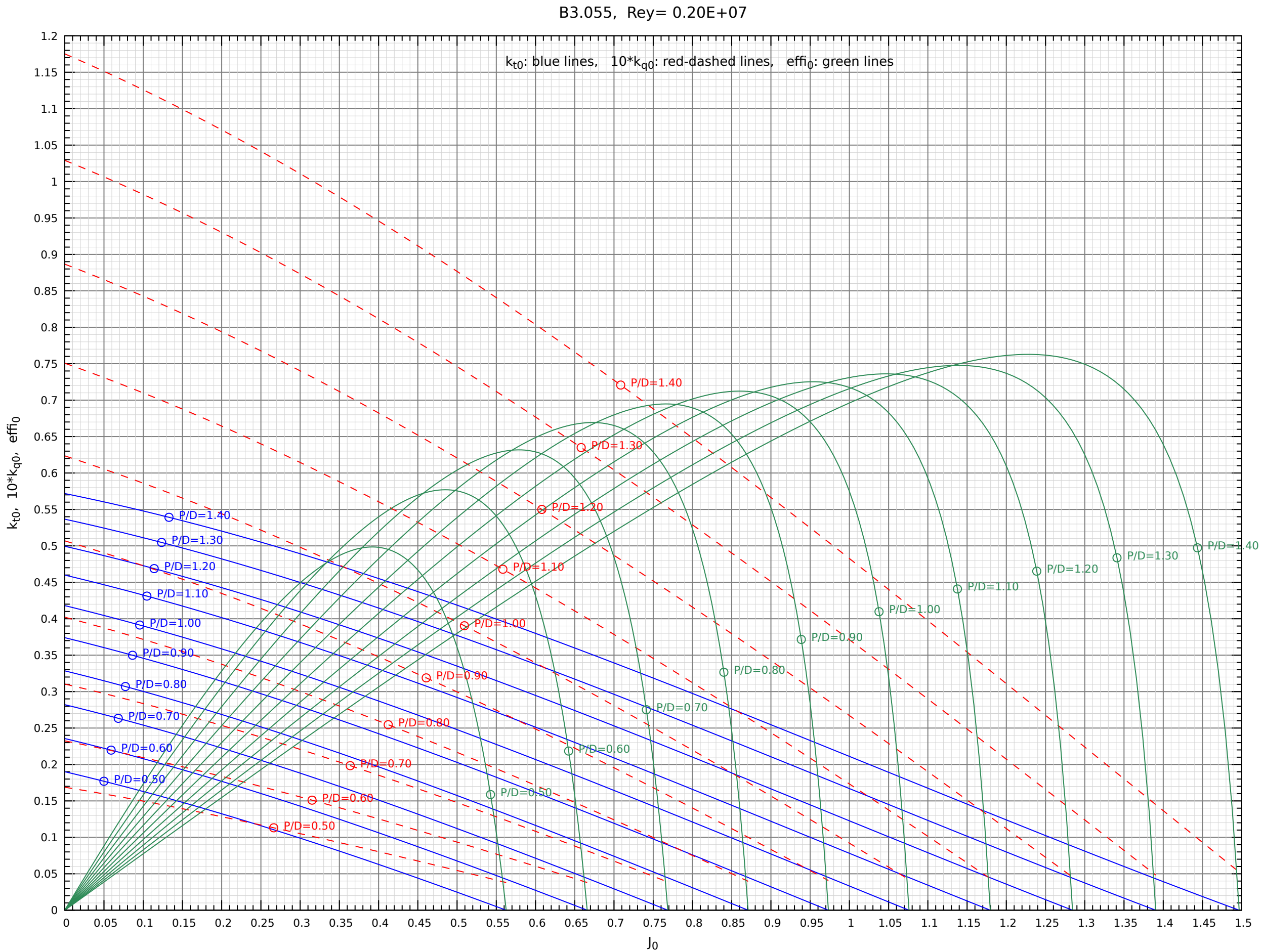
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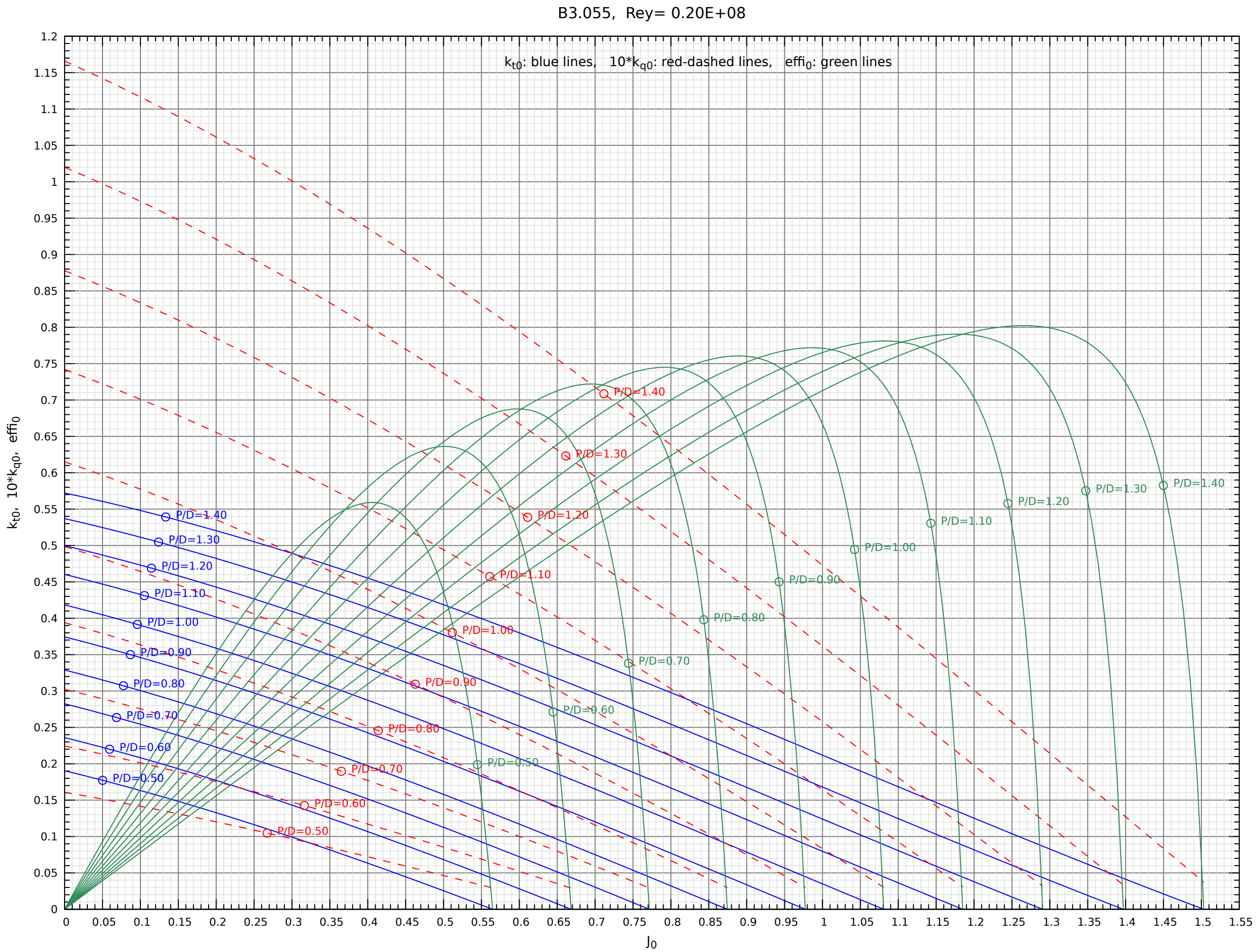
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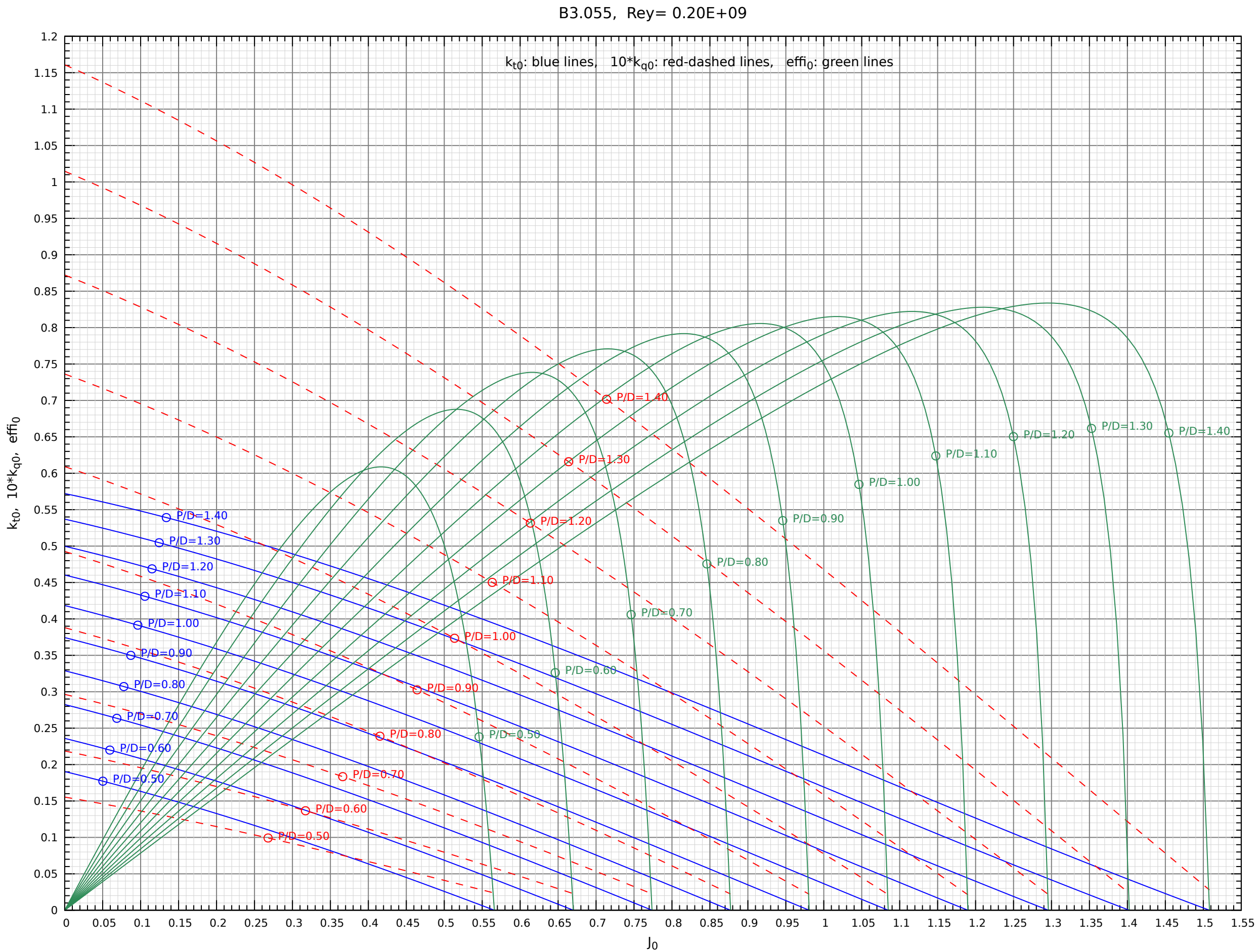
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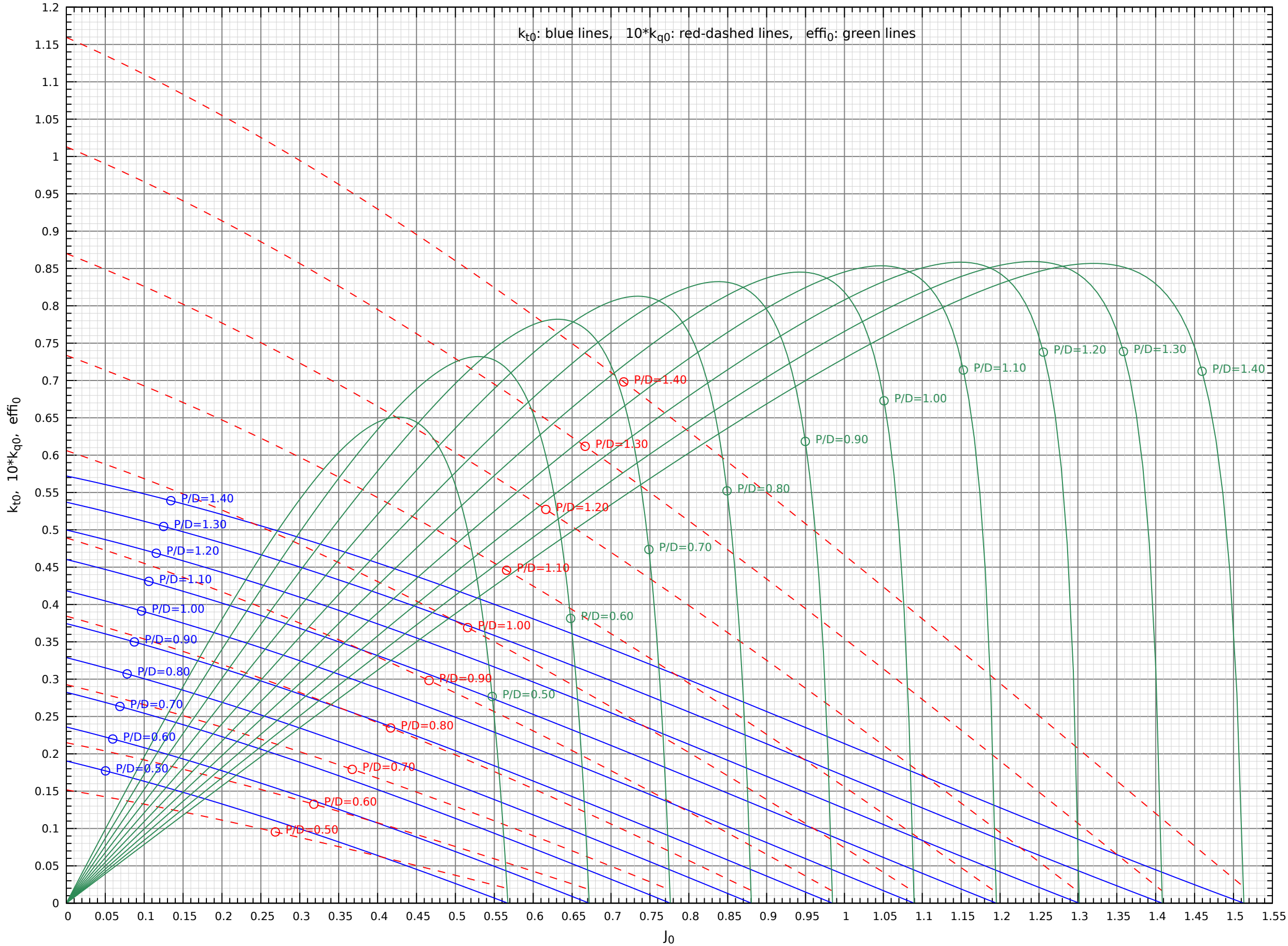

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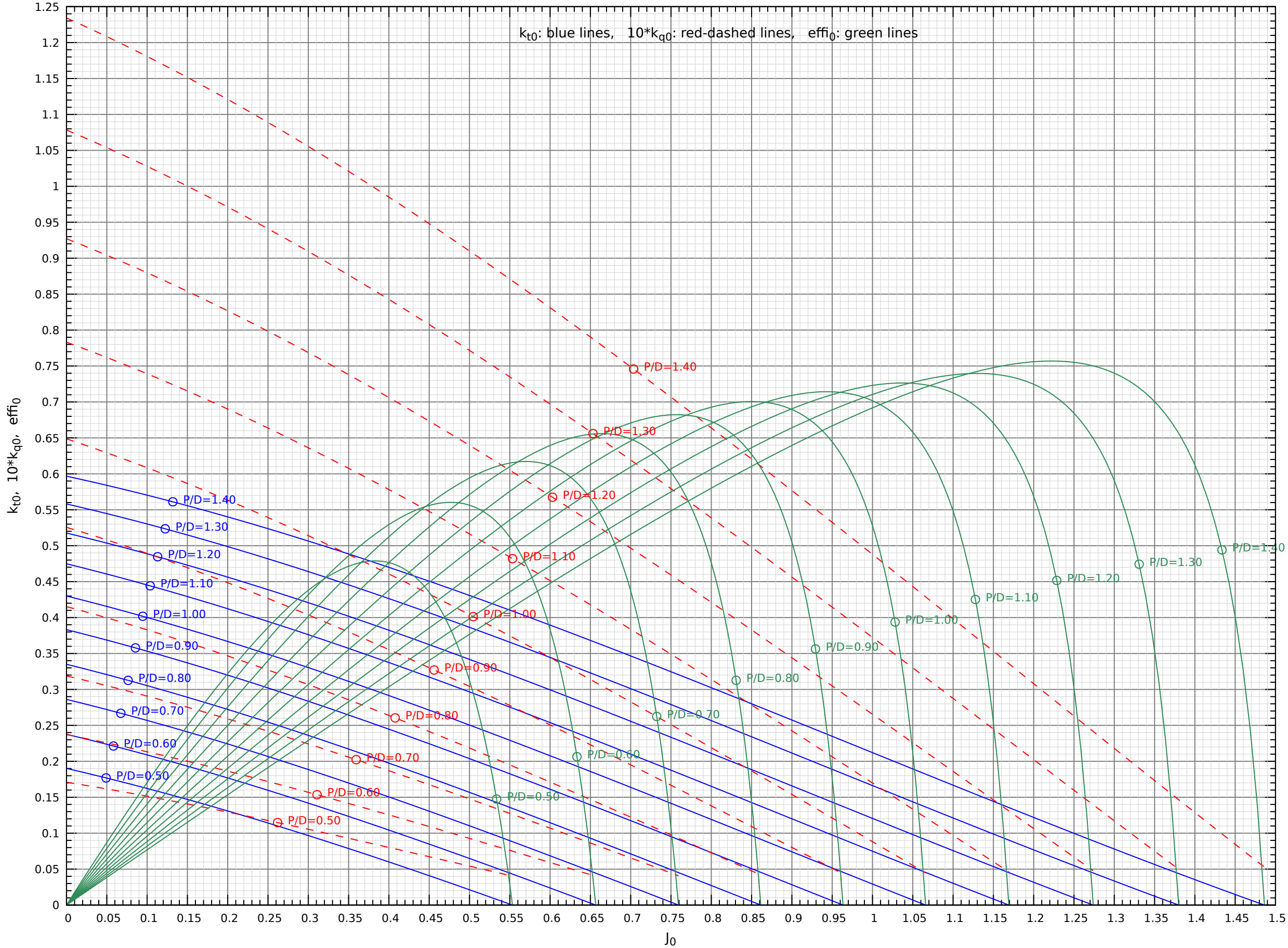

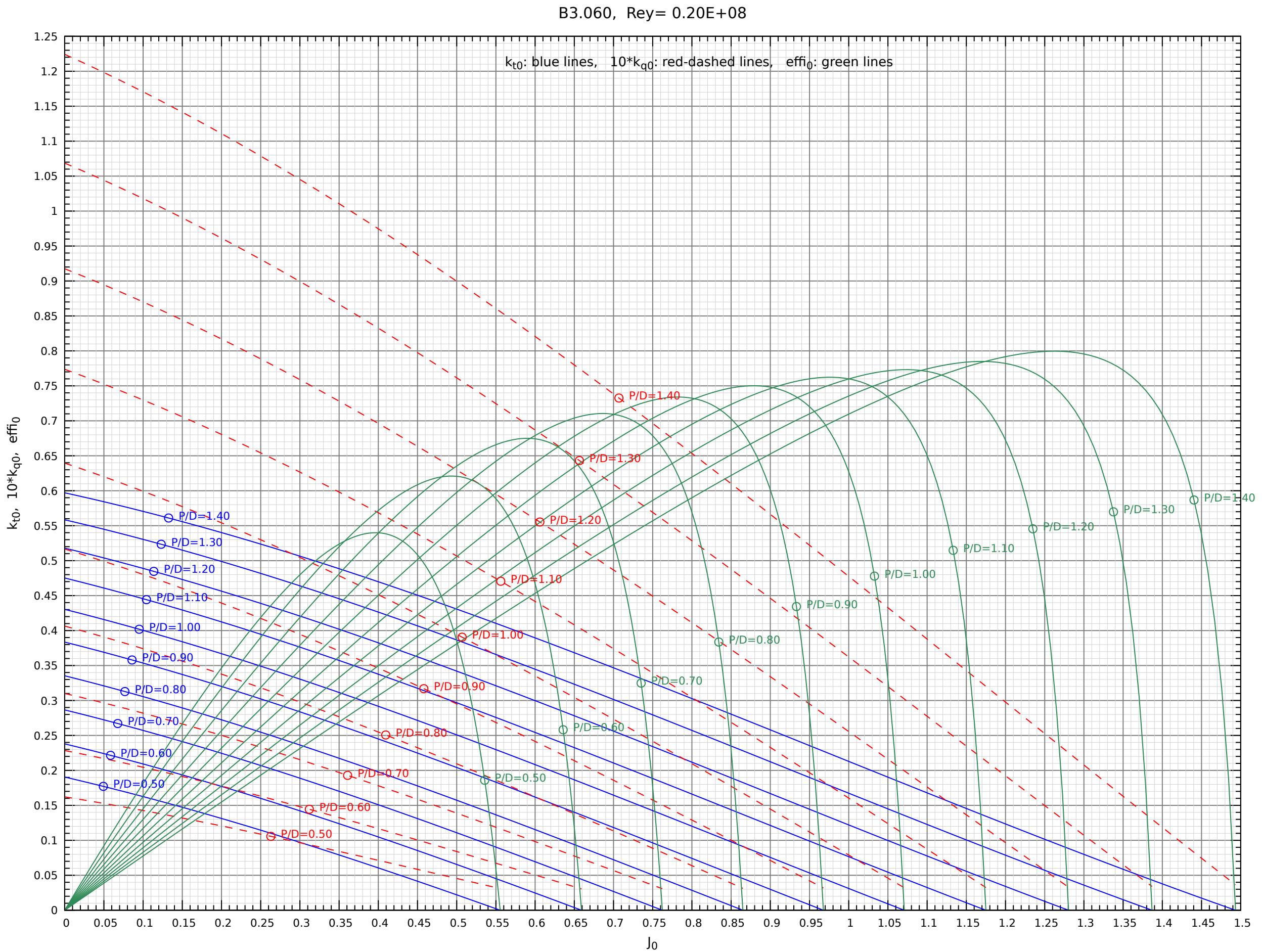
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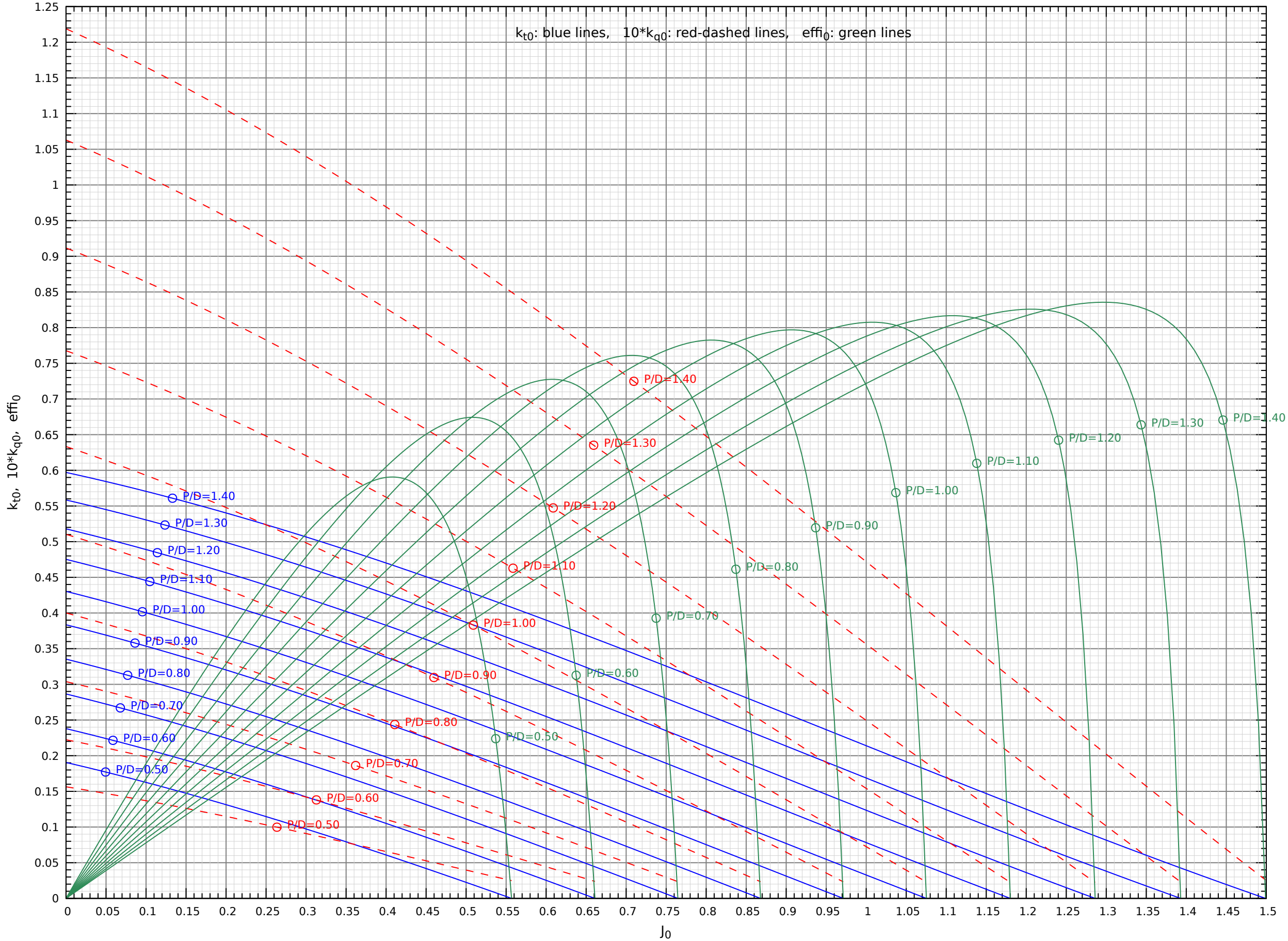
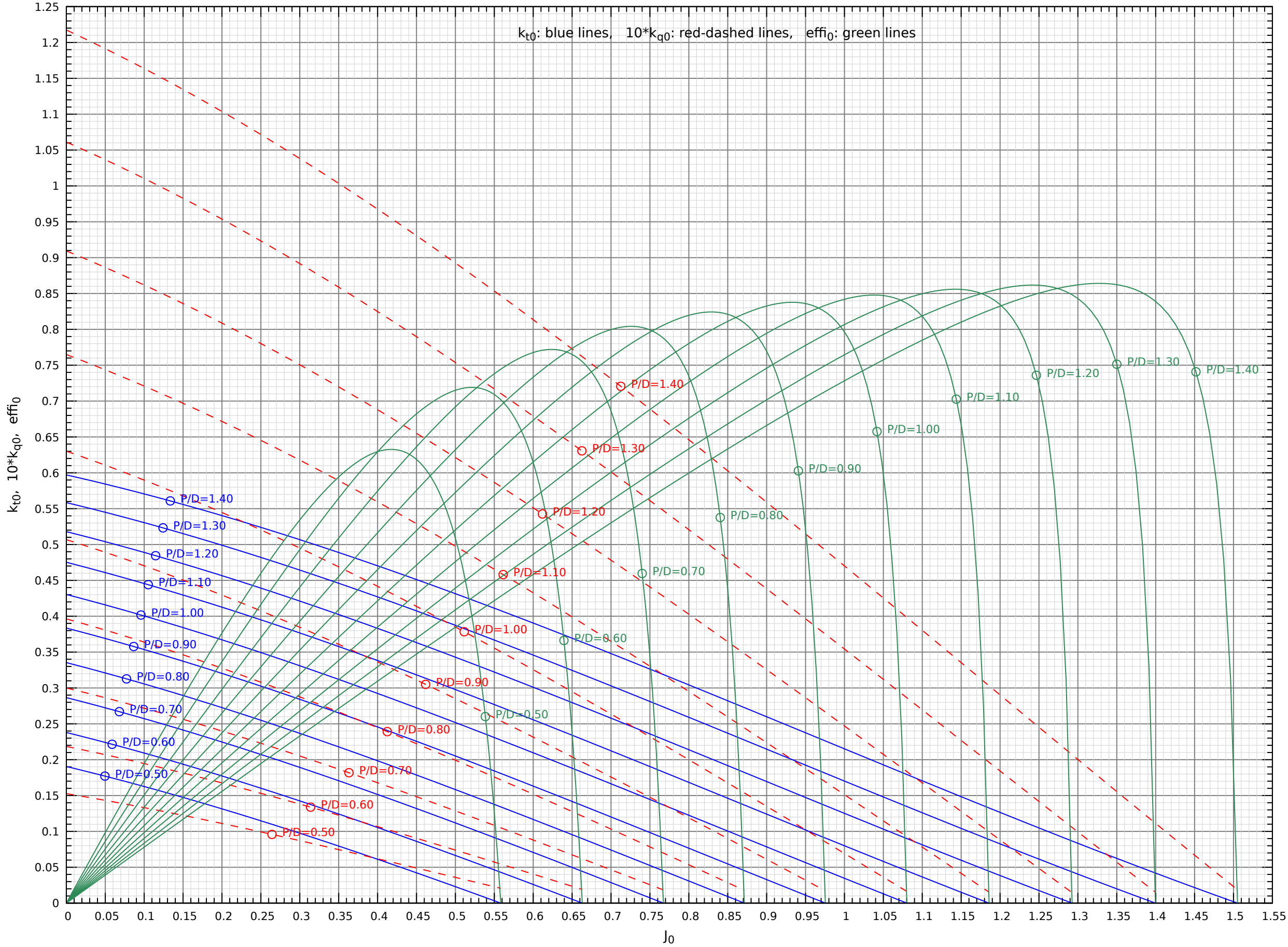
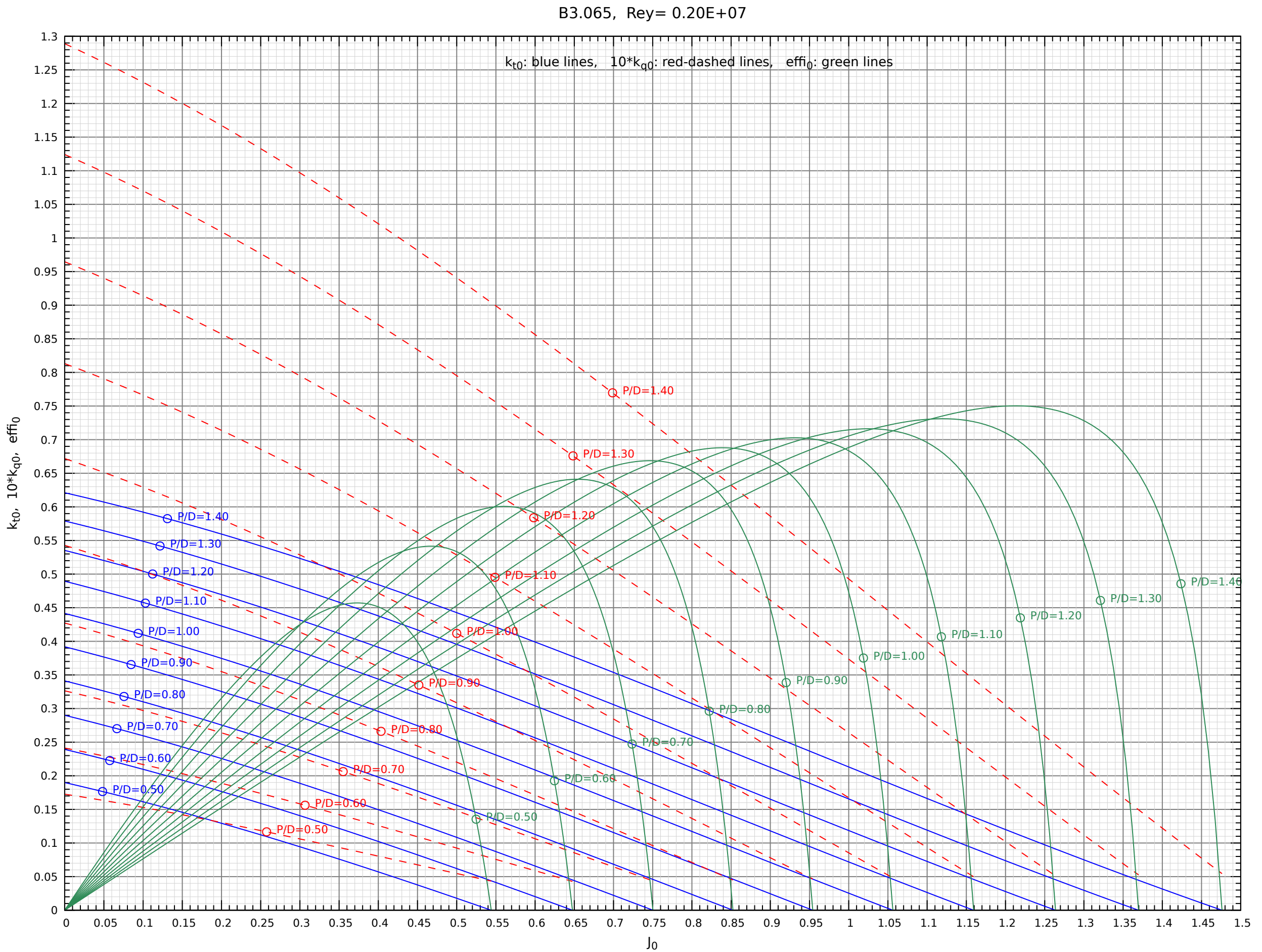
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

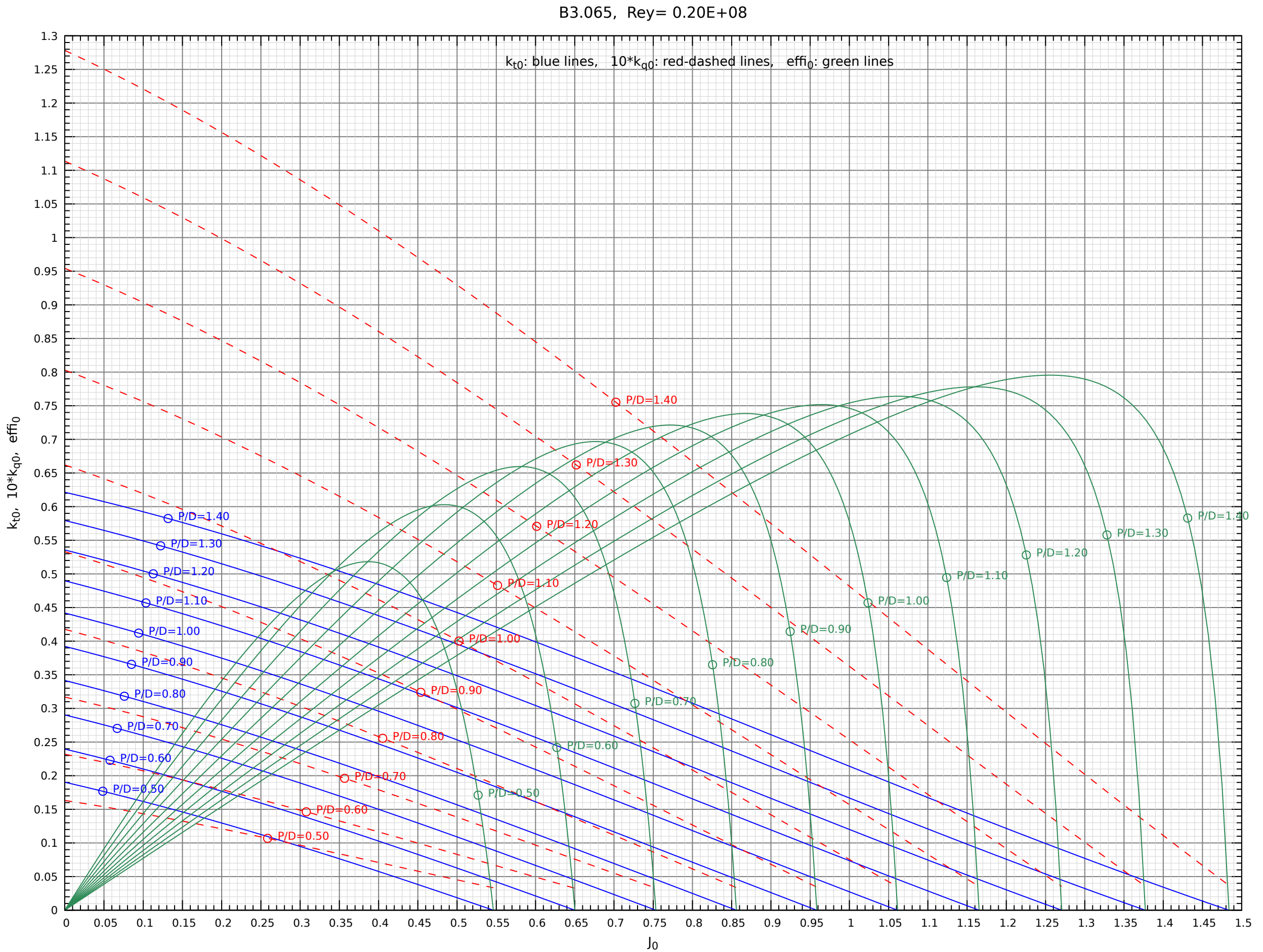
B3.060, Rey= 0.20E+09

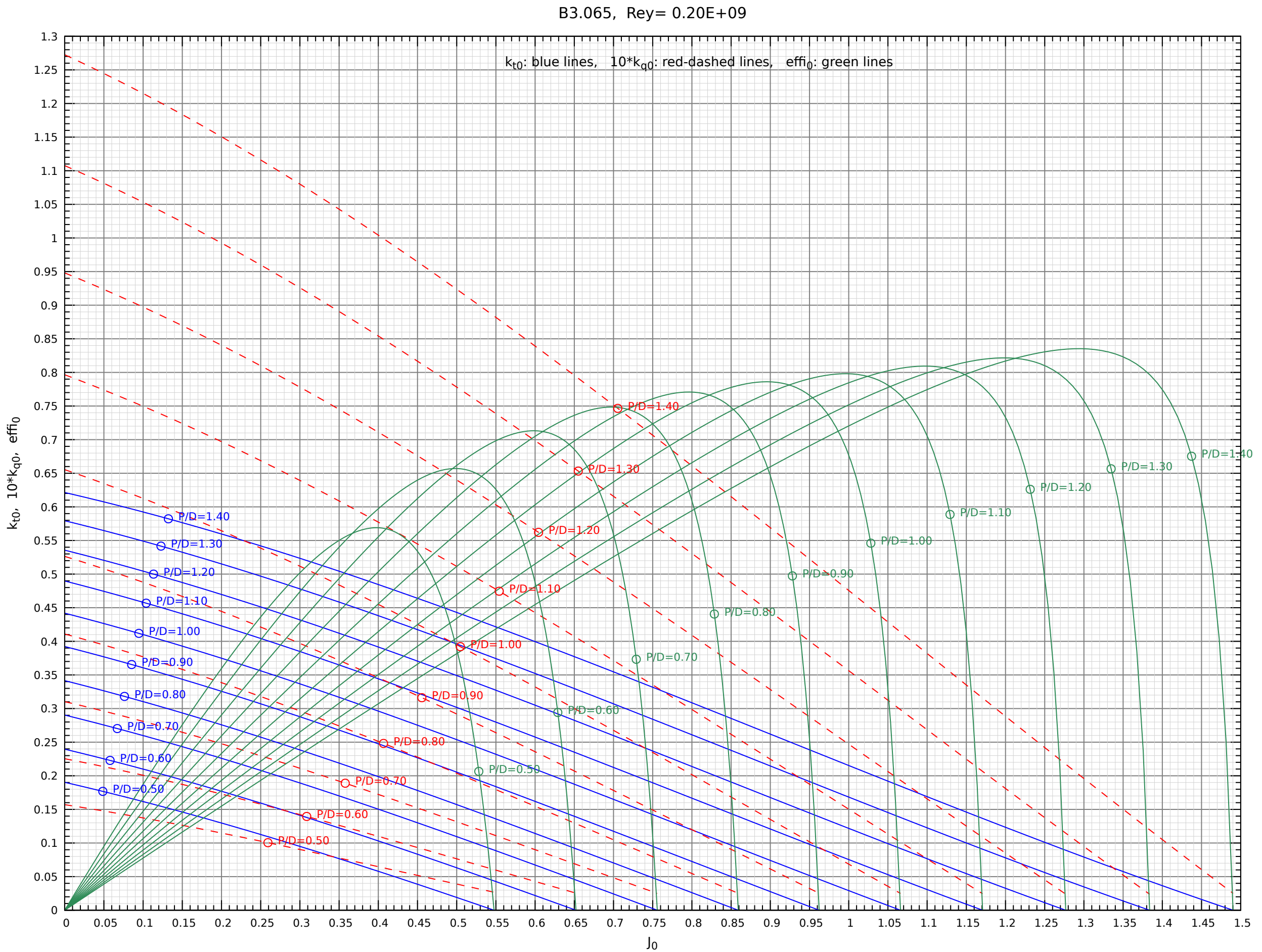


B3.060, Rey= 0.20E+10




B3.065, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.065, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.065, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
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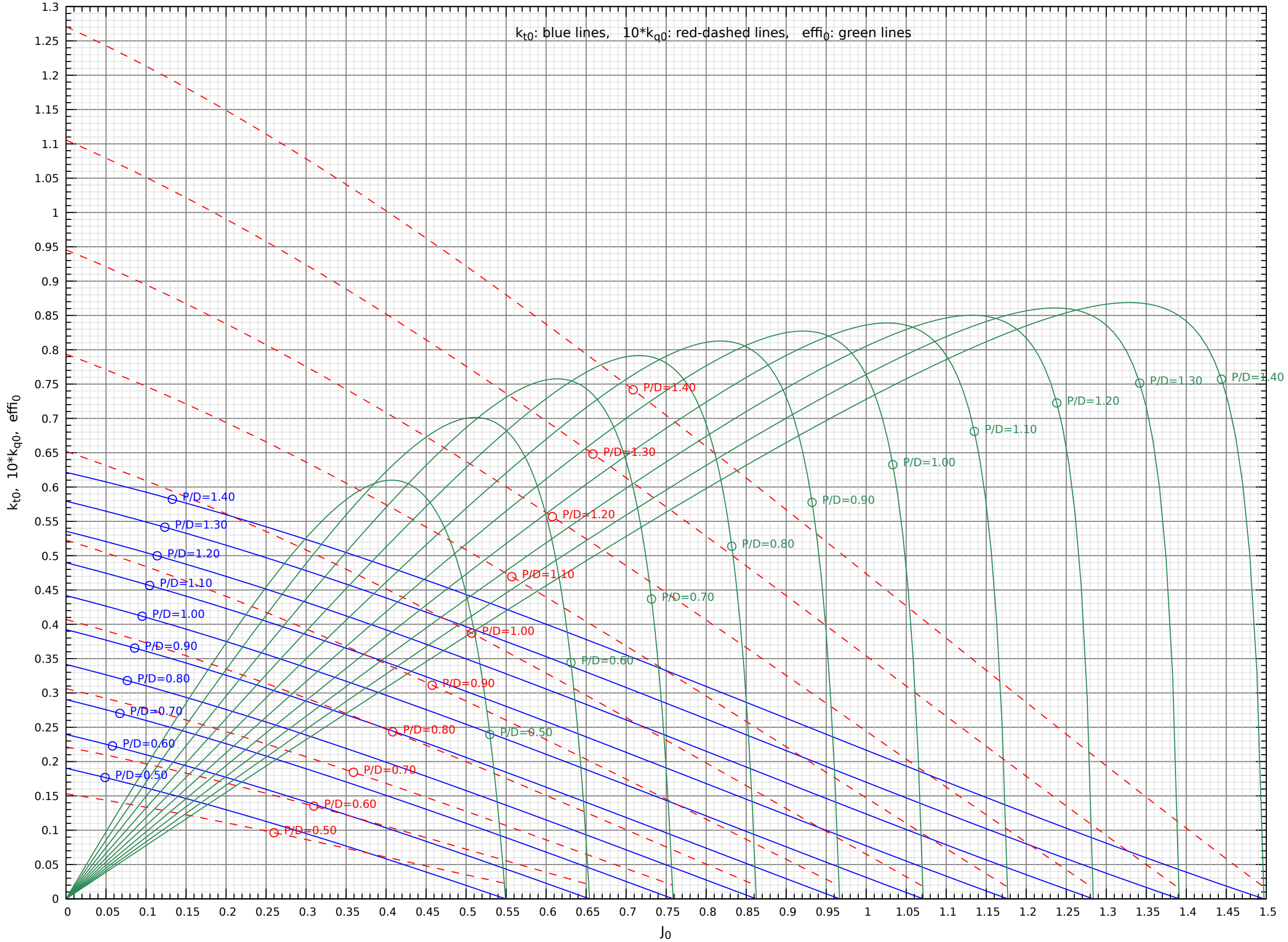
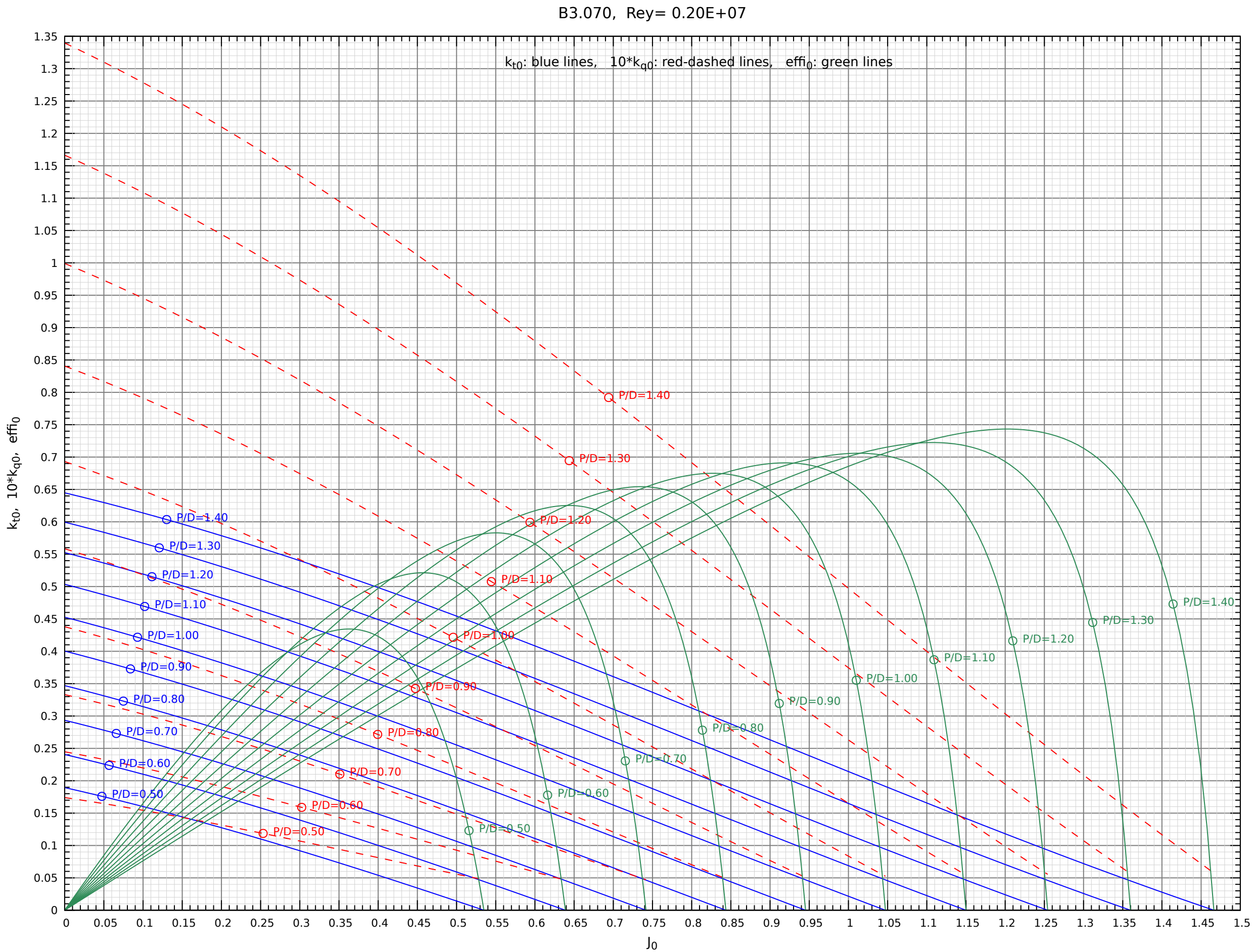
P/D=0.70
P/D=0.60
P/D=0.50

B3.065, Rey= 0.20E+10

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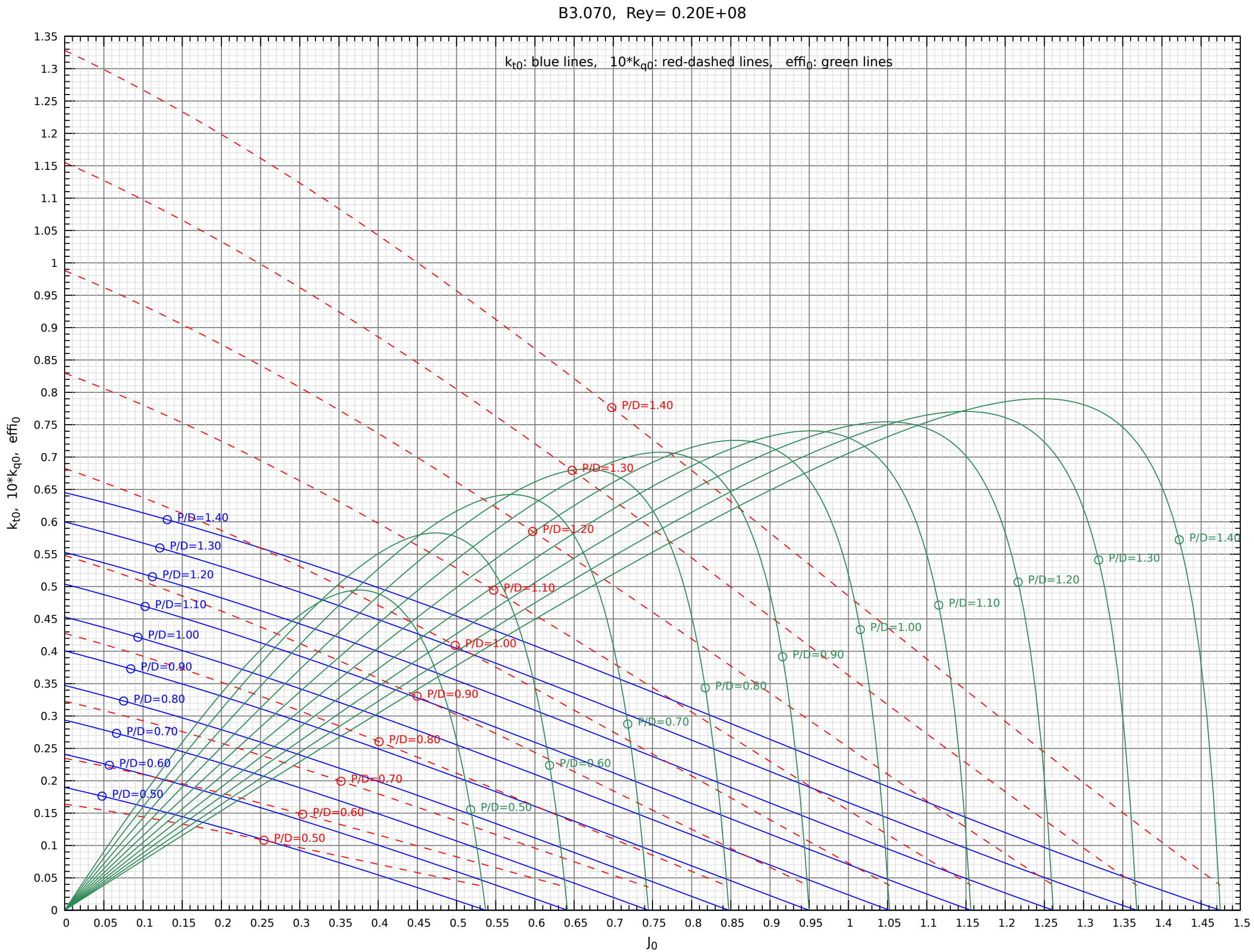
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.070, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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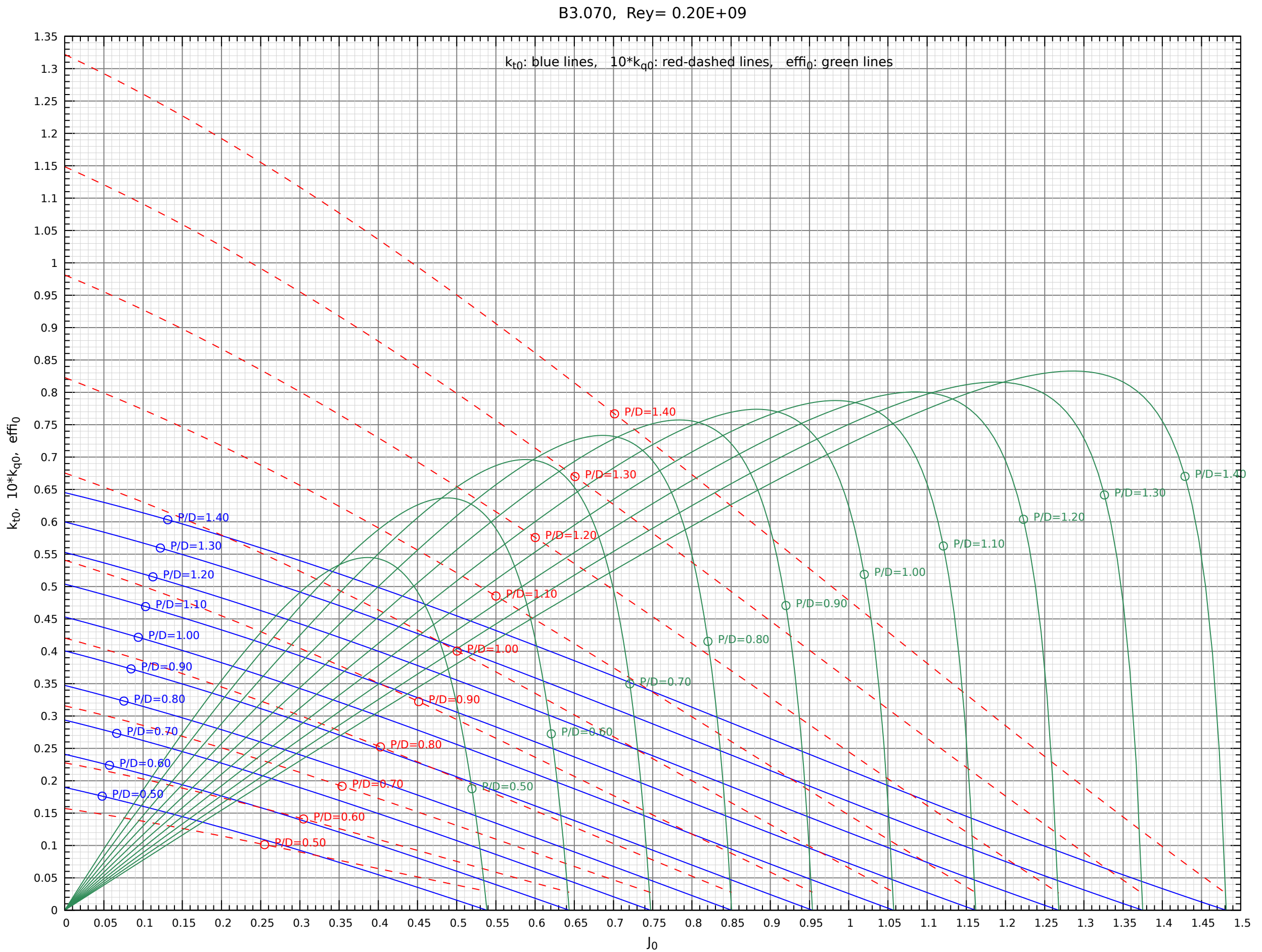
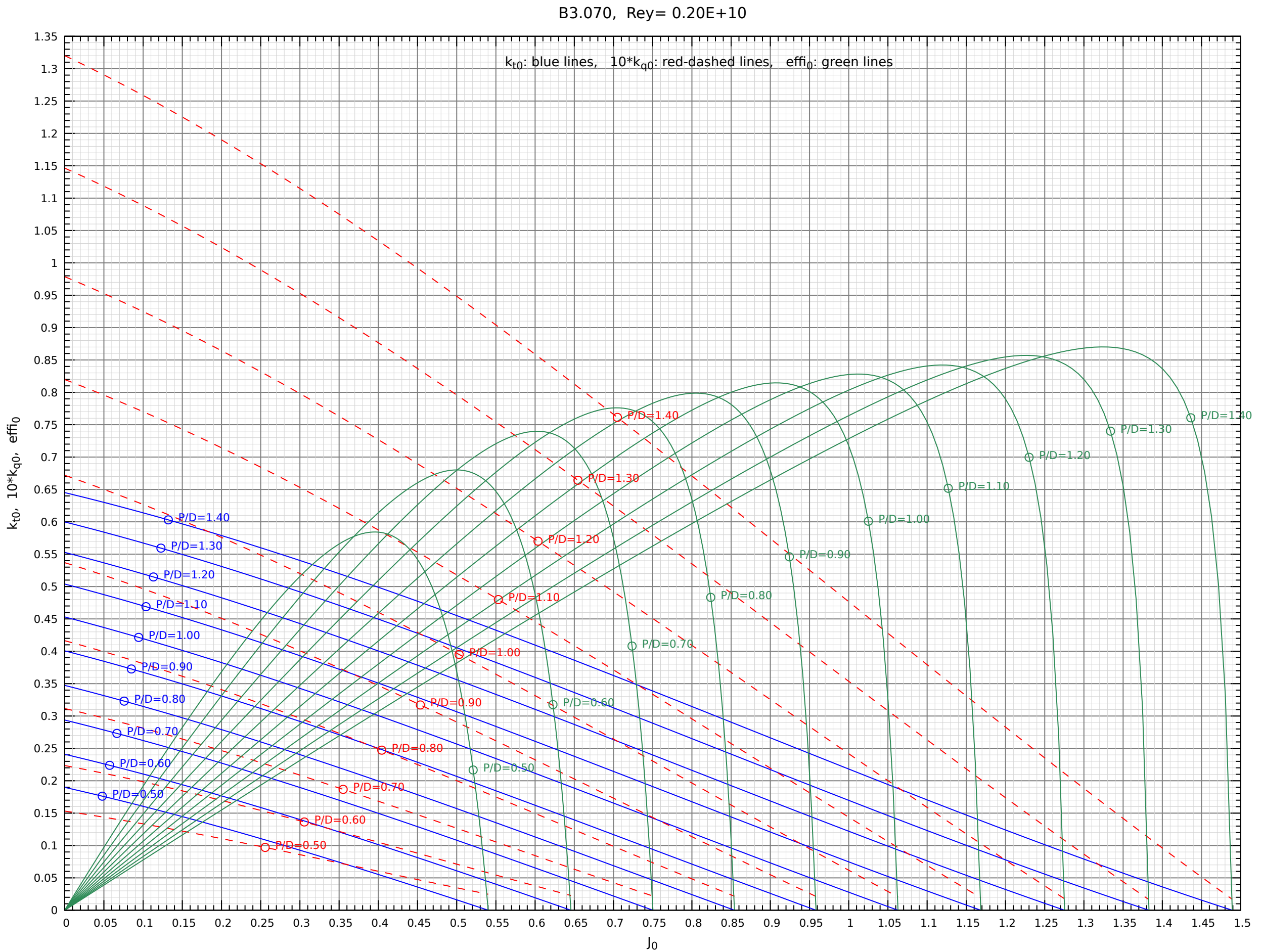
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.070, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.070, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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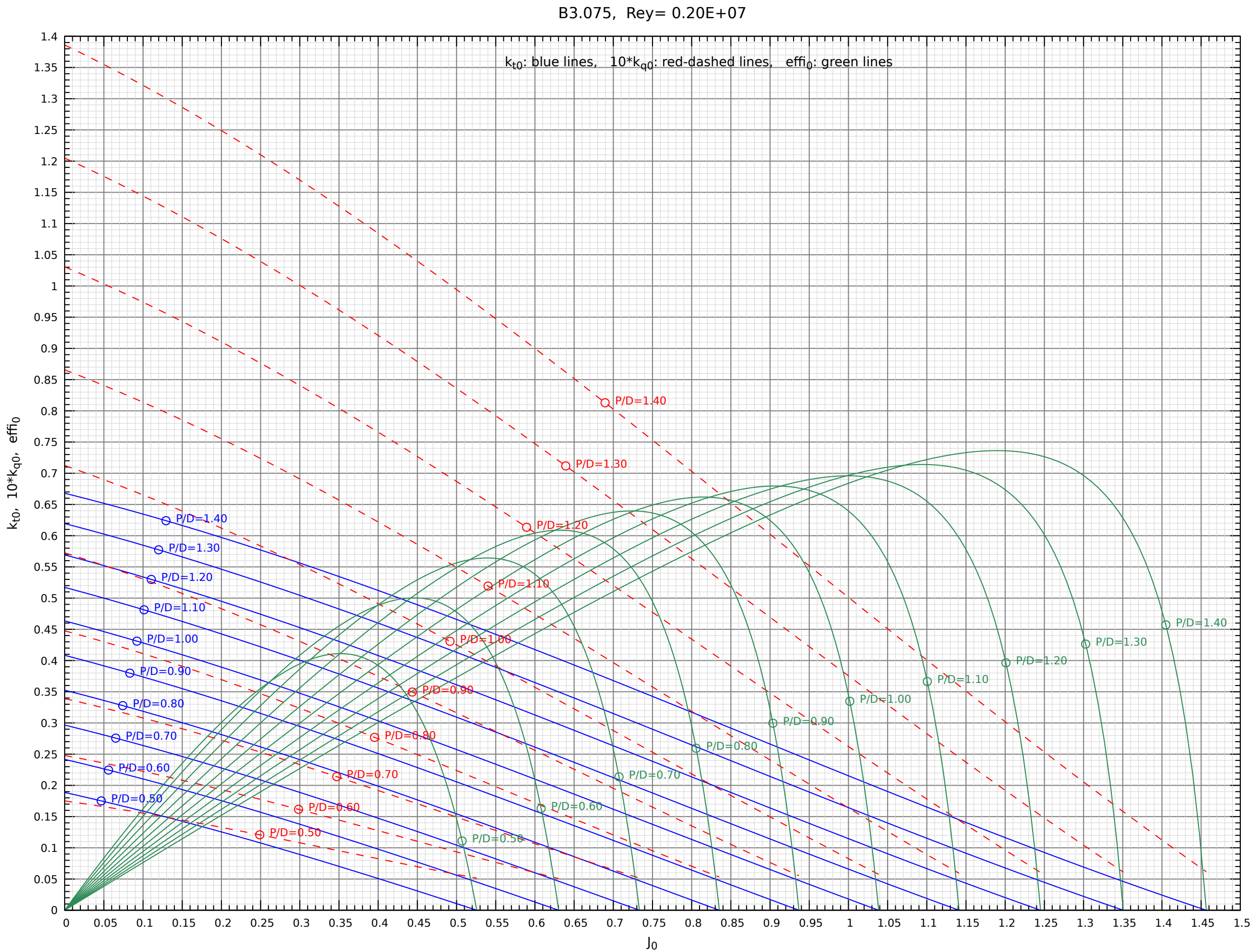
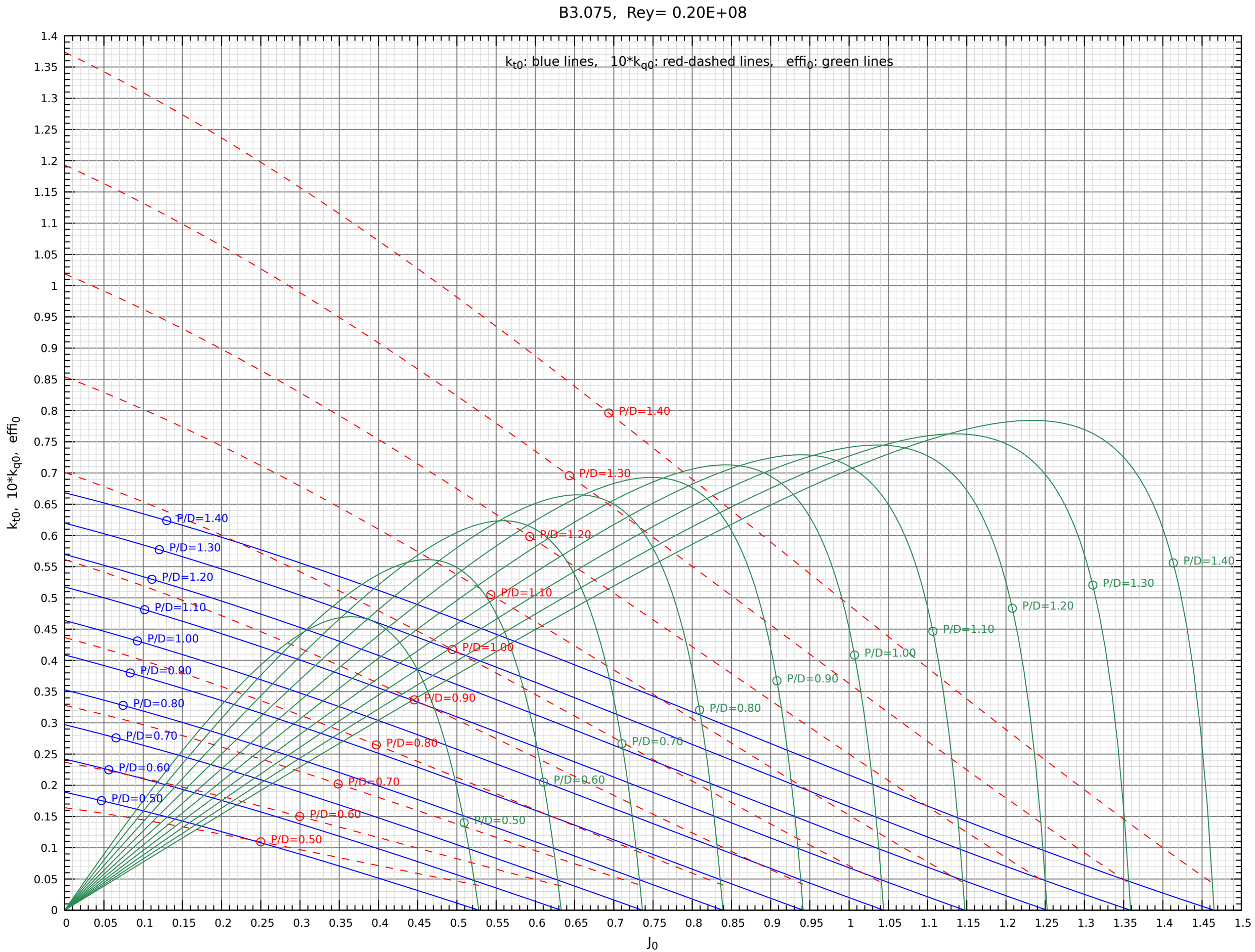
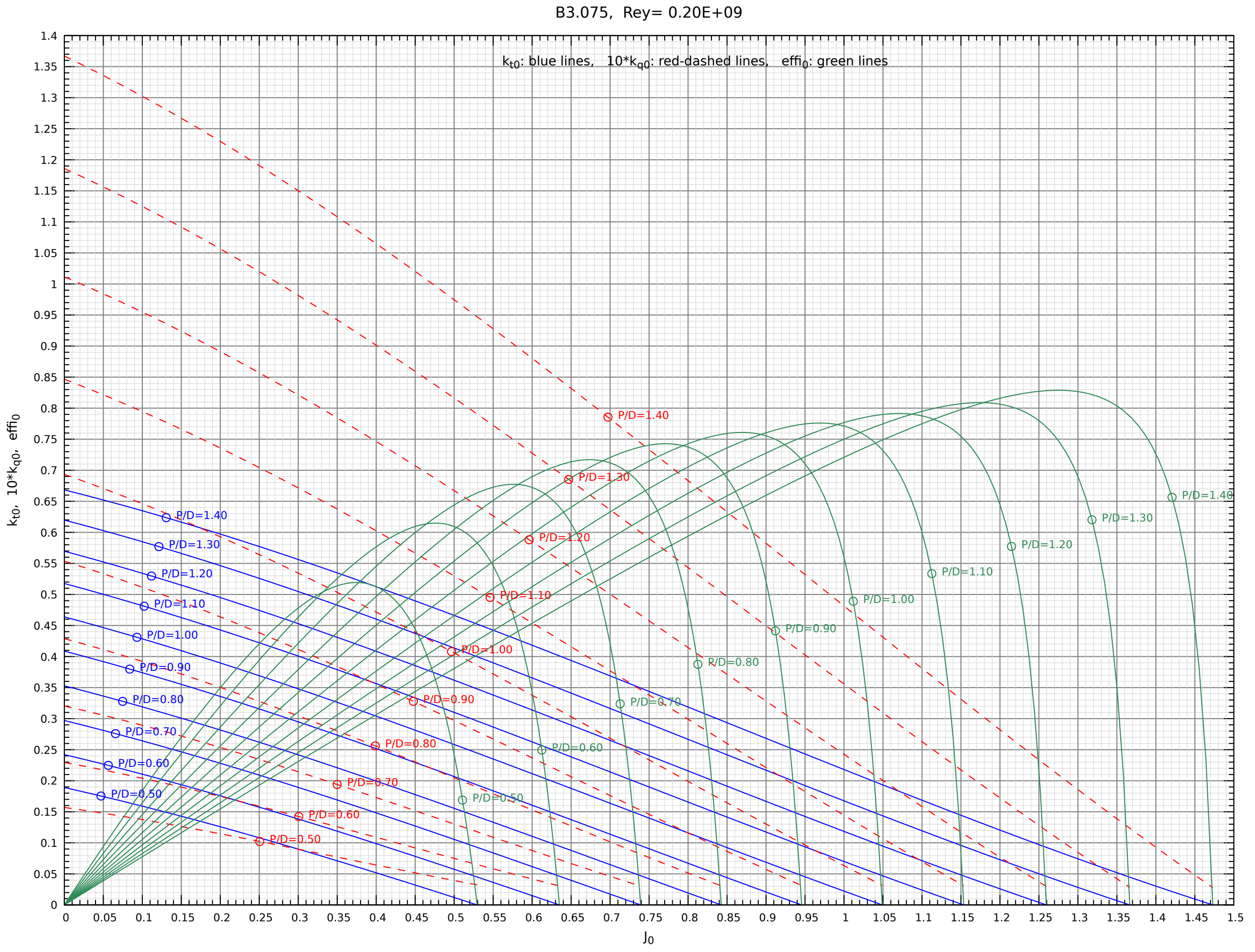
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.075, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.075, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.075, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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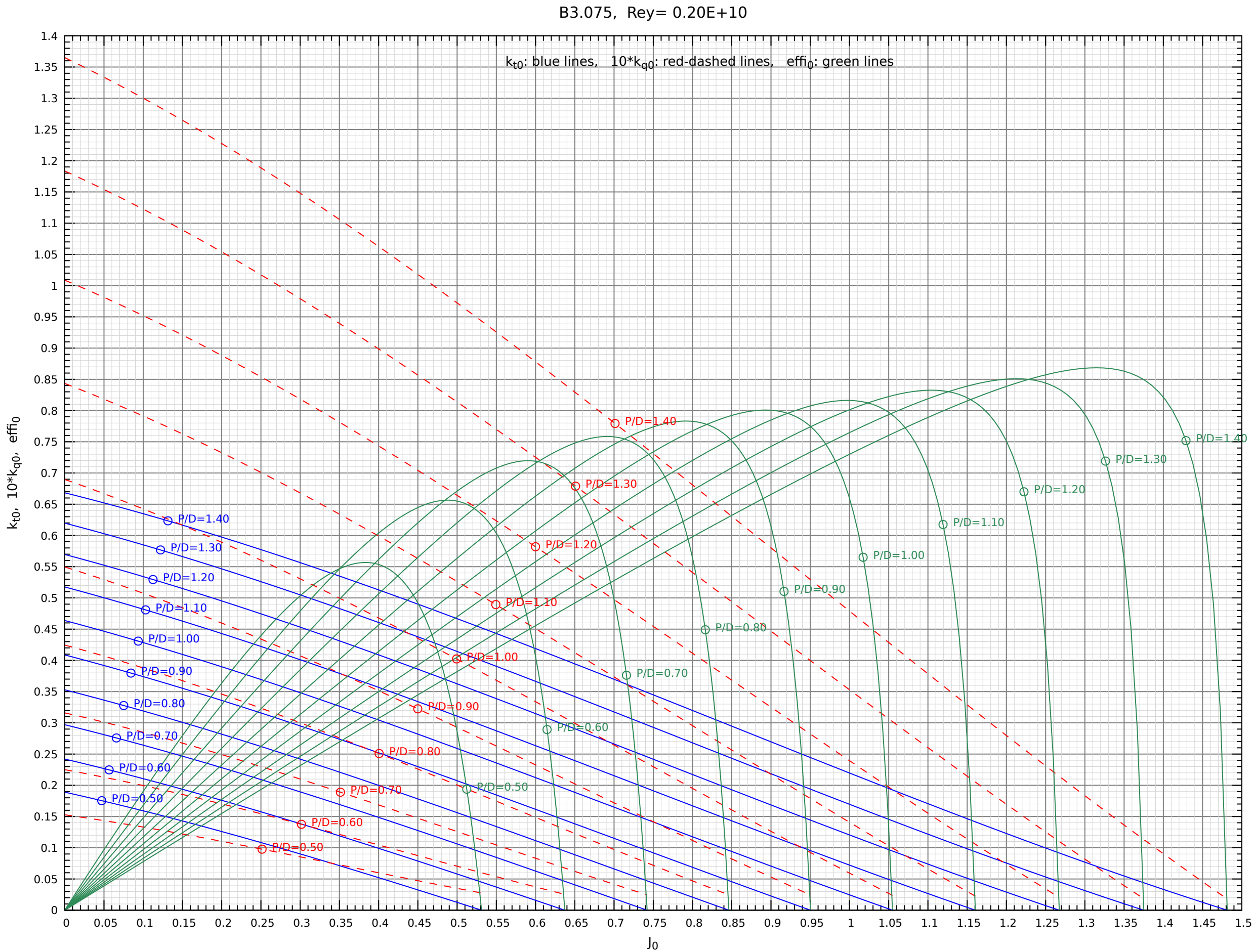
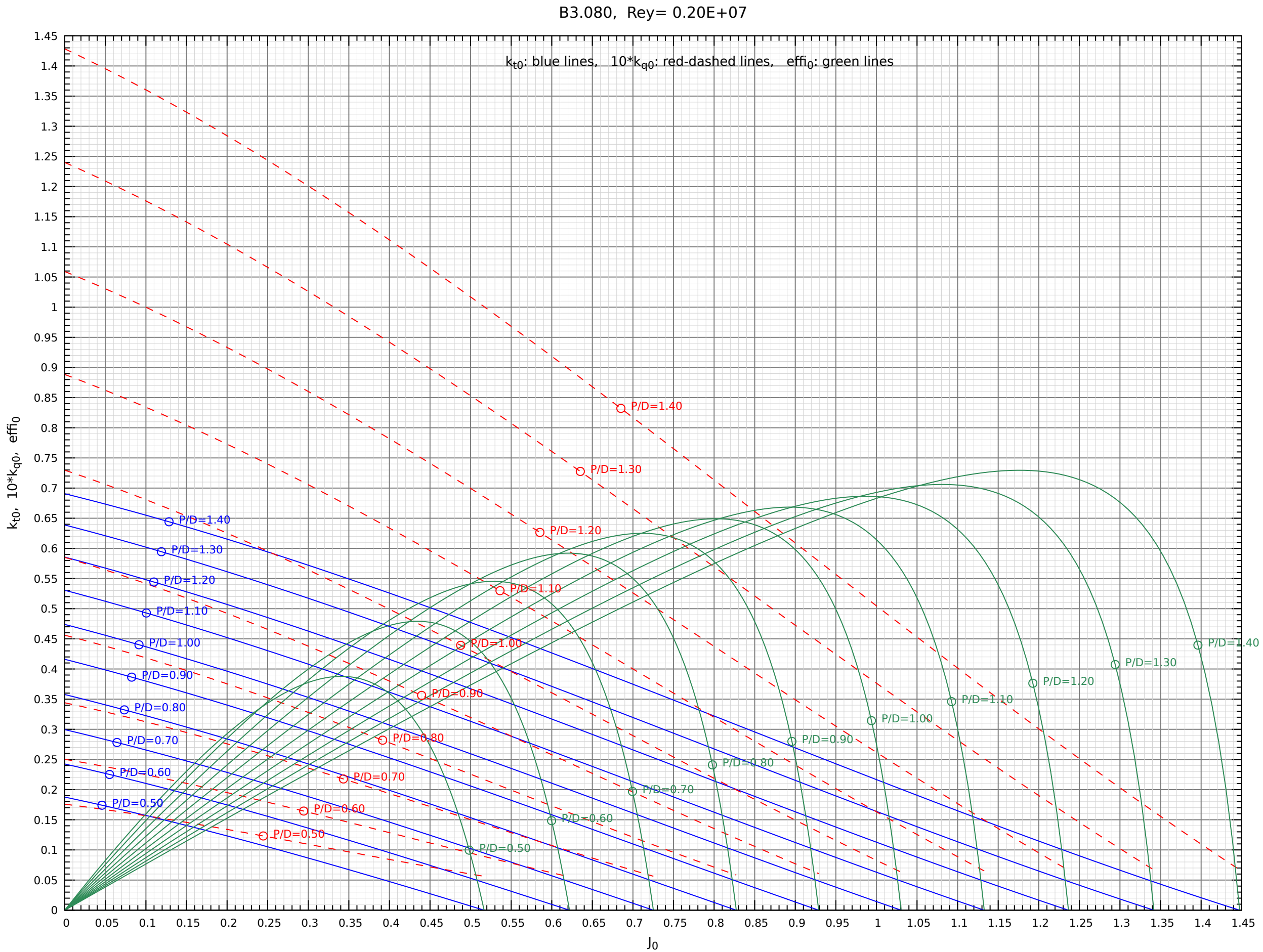
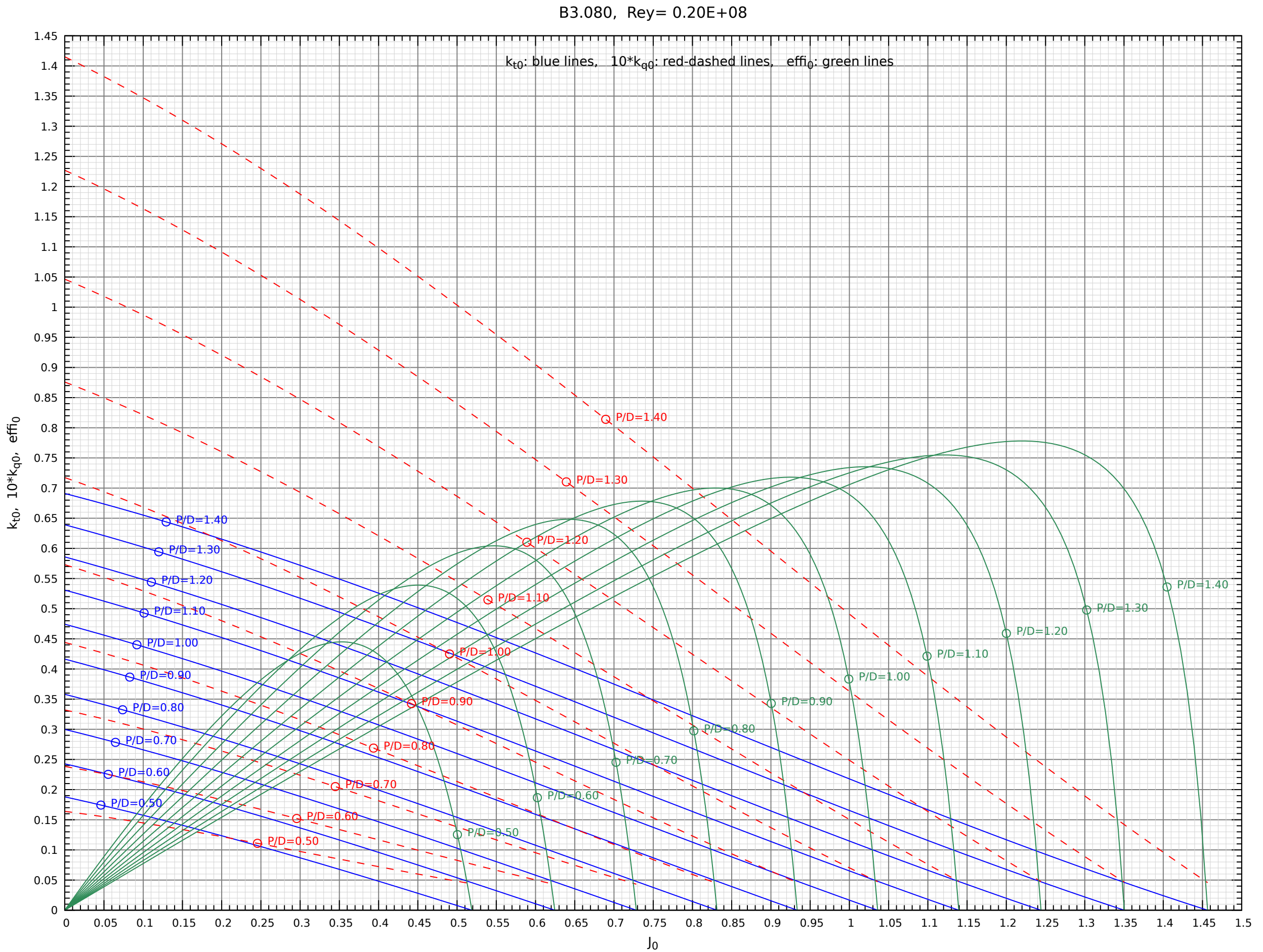

B3.075, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.080, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.080, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
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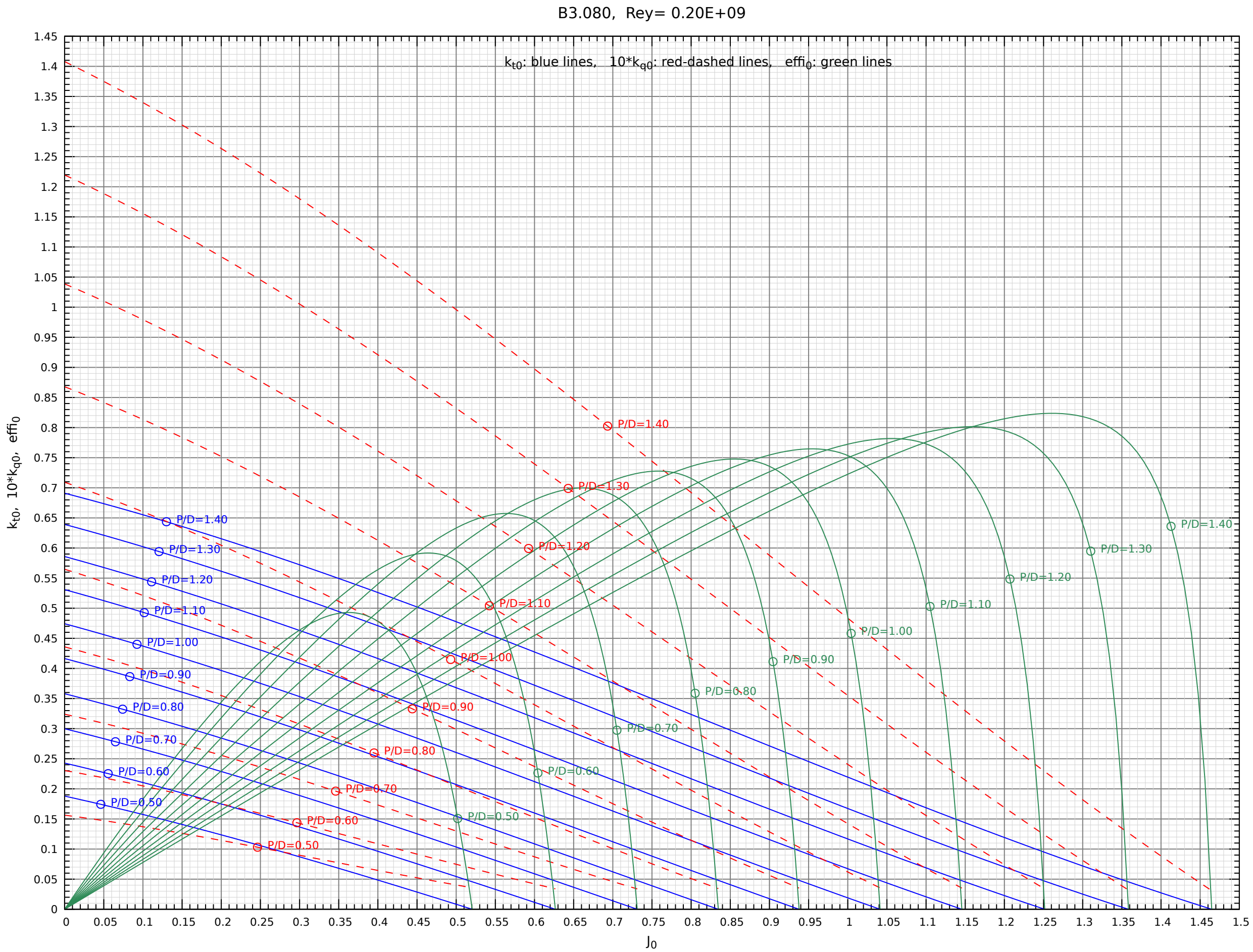
P/D=0.60
P/D=0.50


B3.080, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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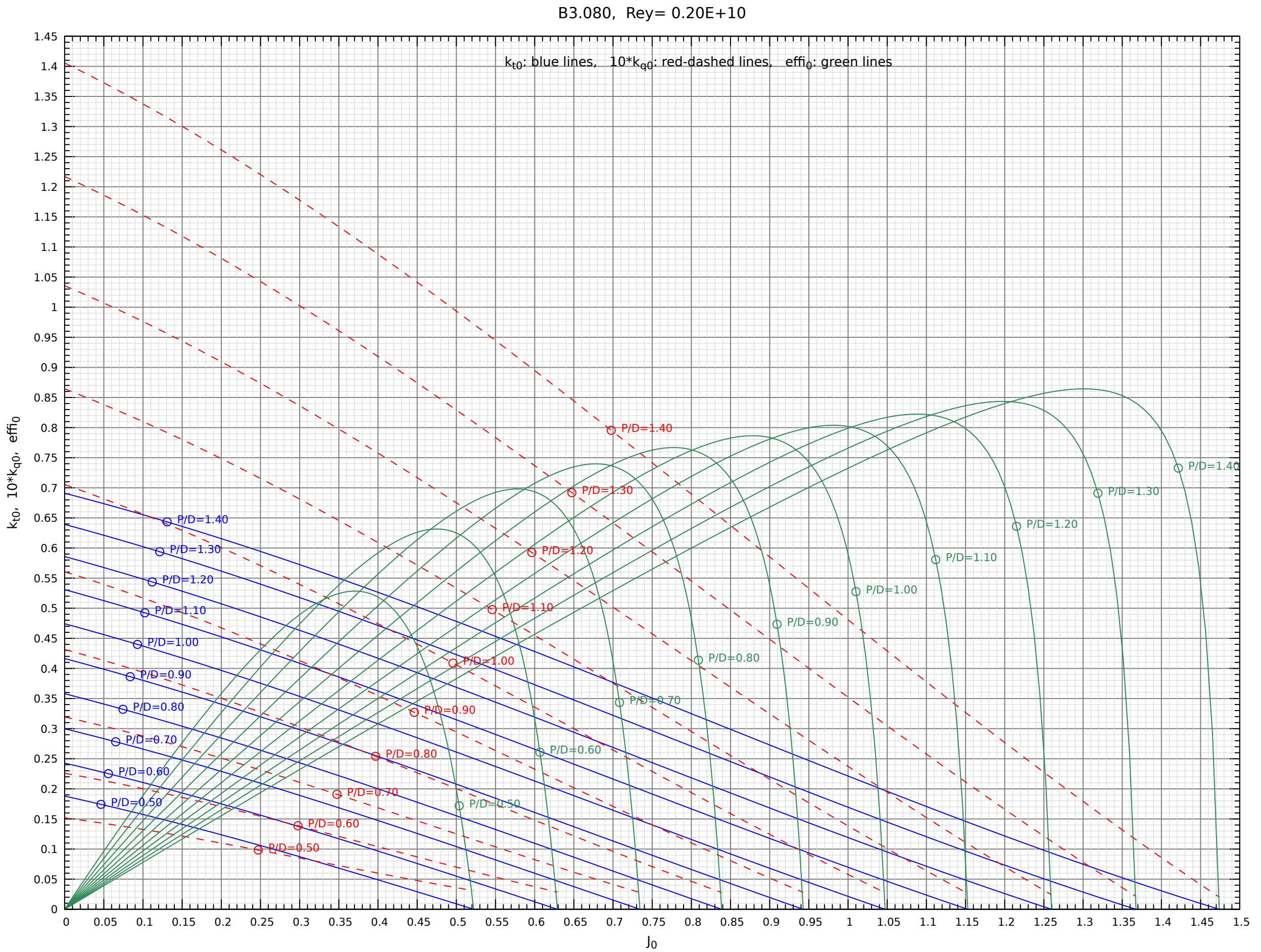
B3.080, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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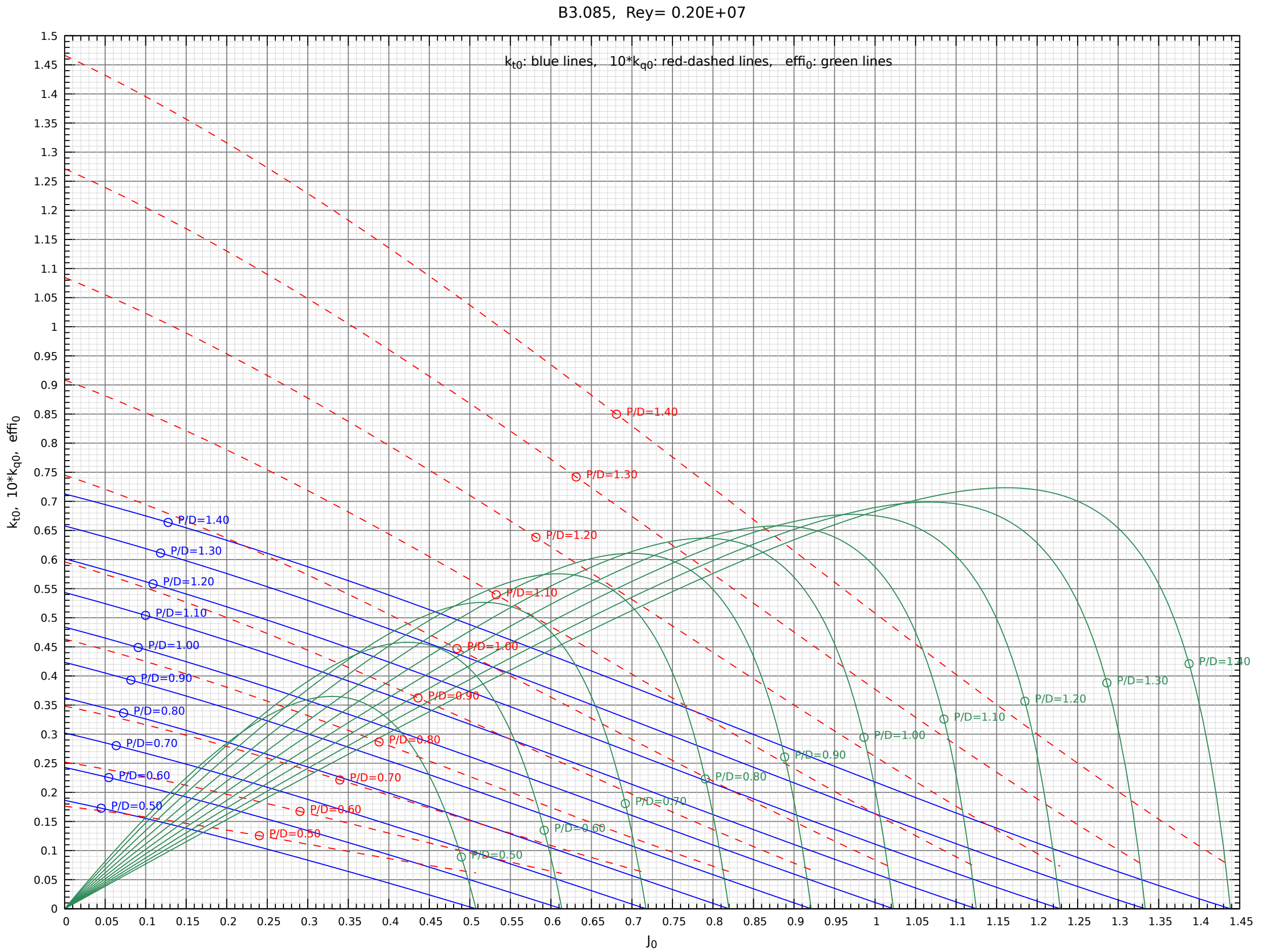
P/D=0.60
P/D=0.50


B3.085, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
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P/D=0.60
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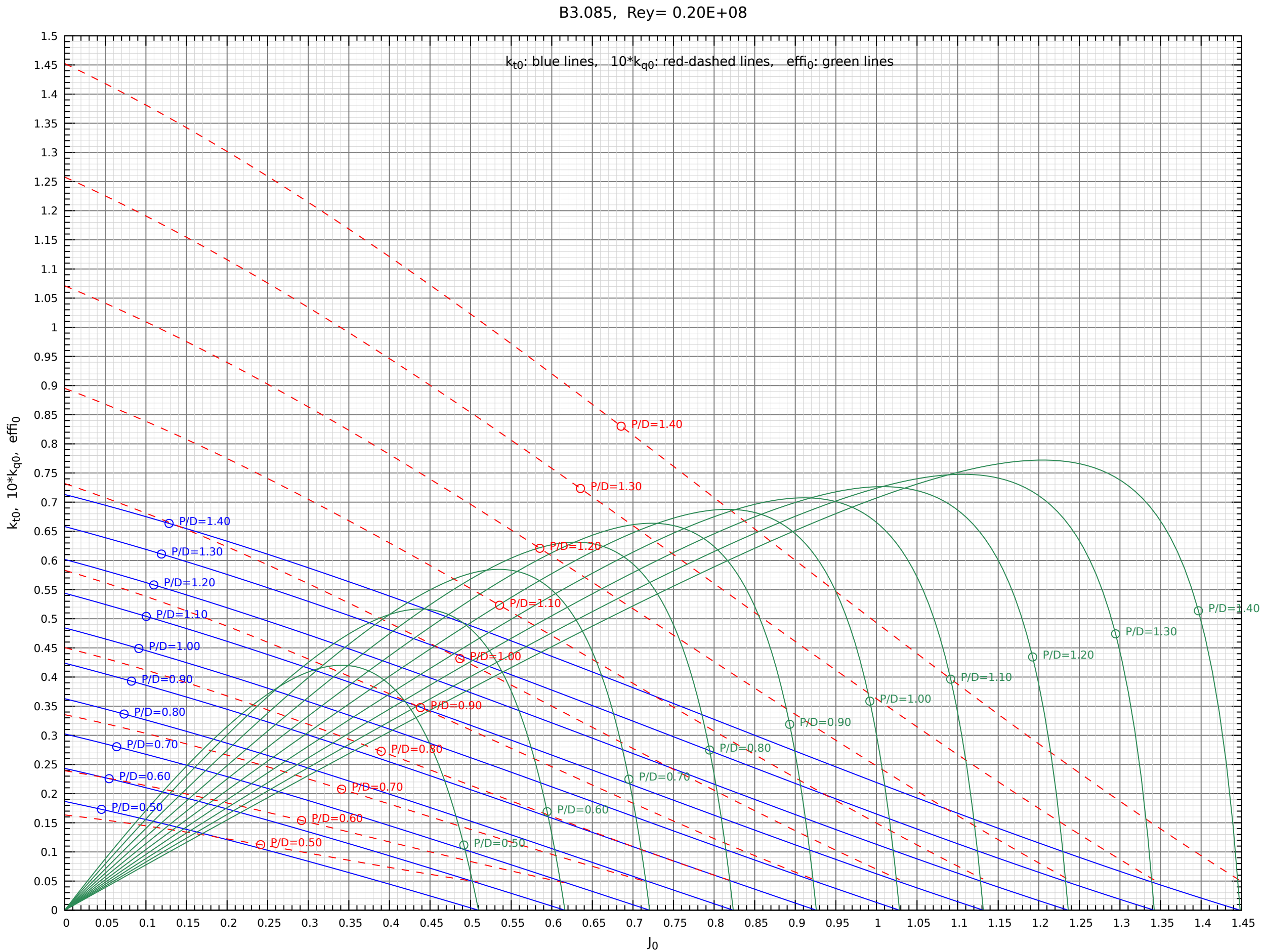
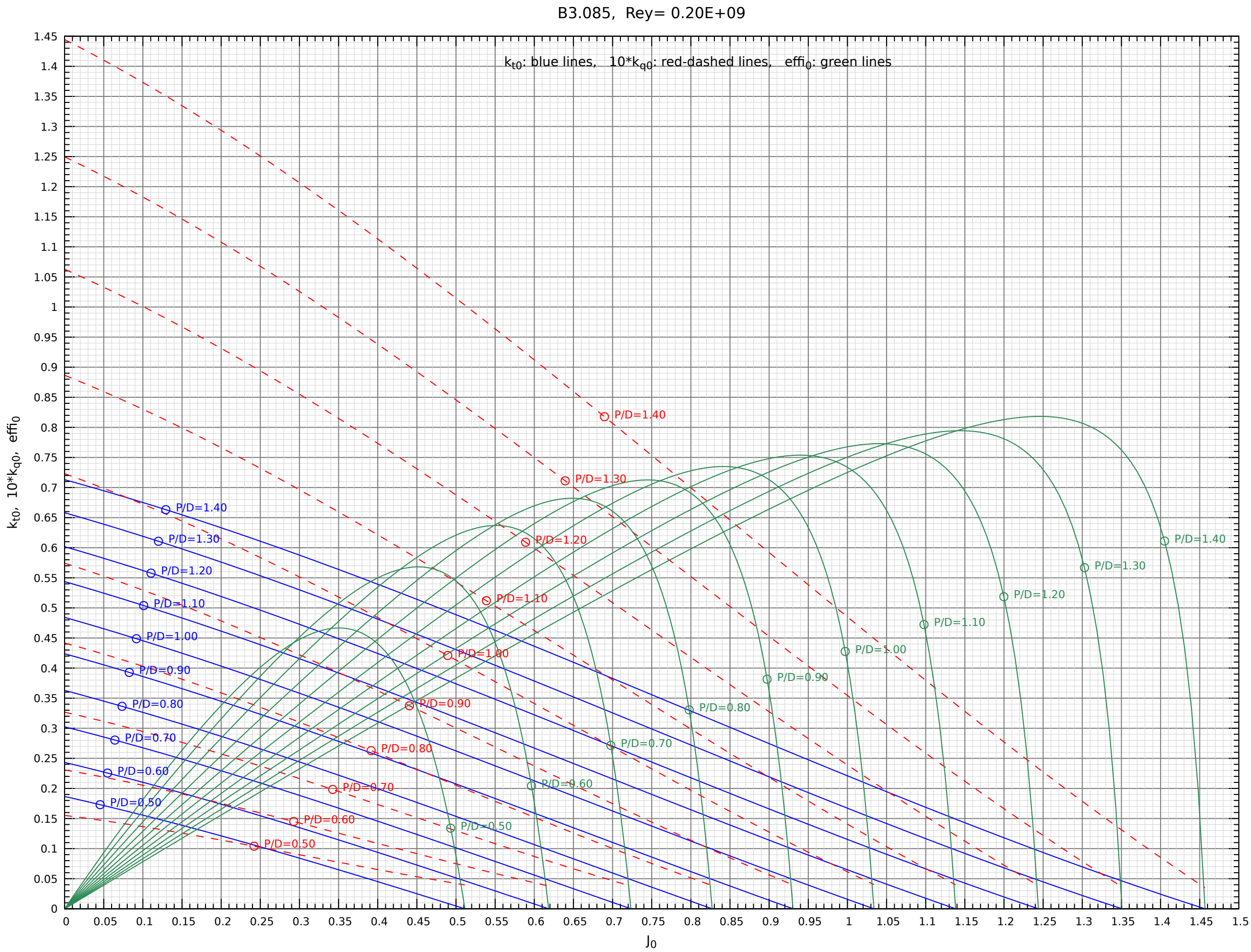

B3.085, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.085, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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P/D=0.80
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P/D=0.60
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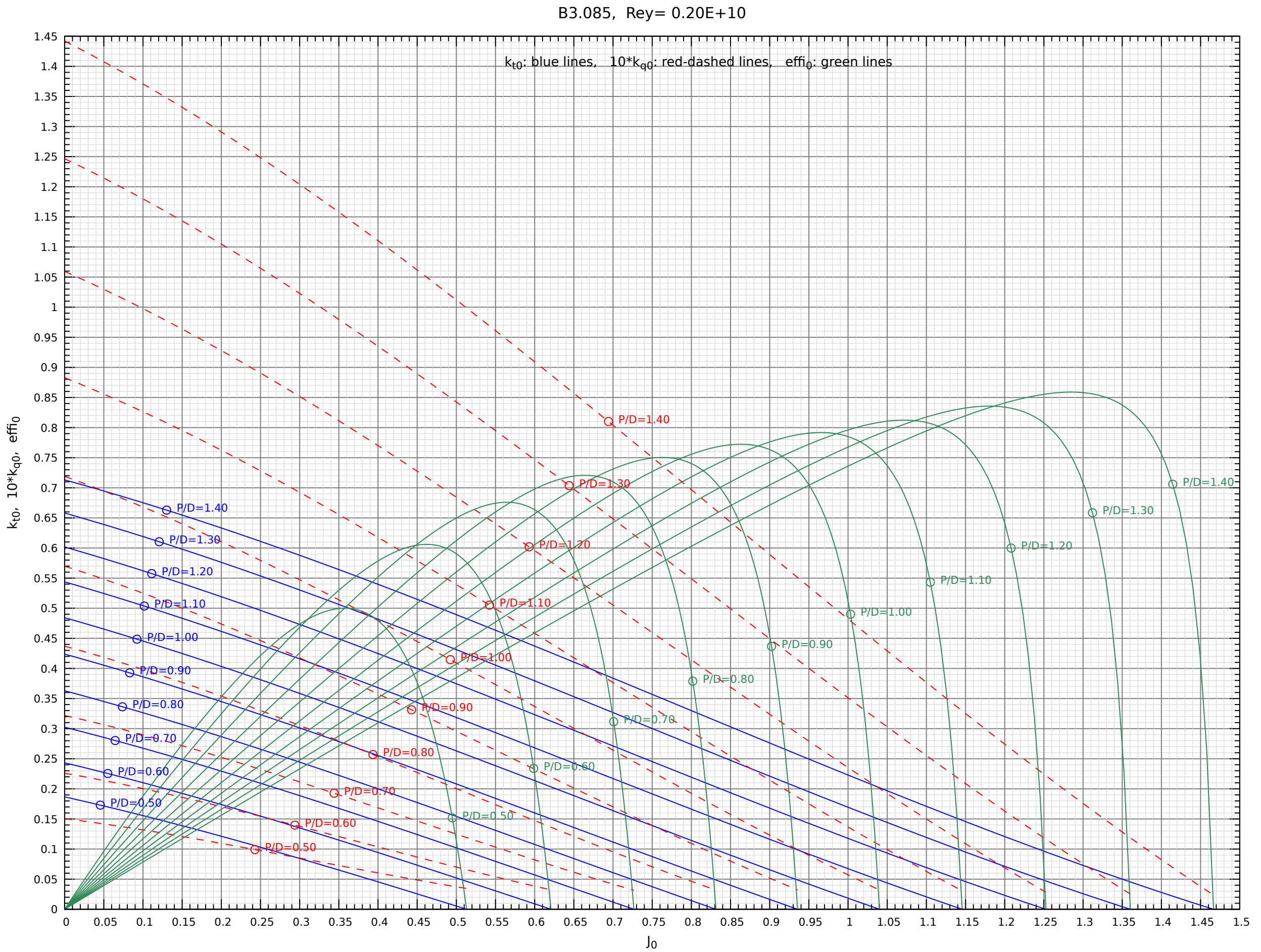
B3.085, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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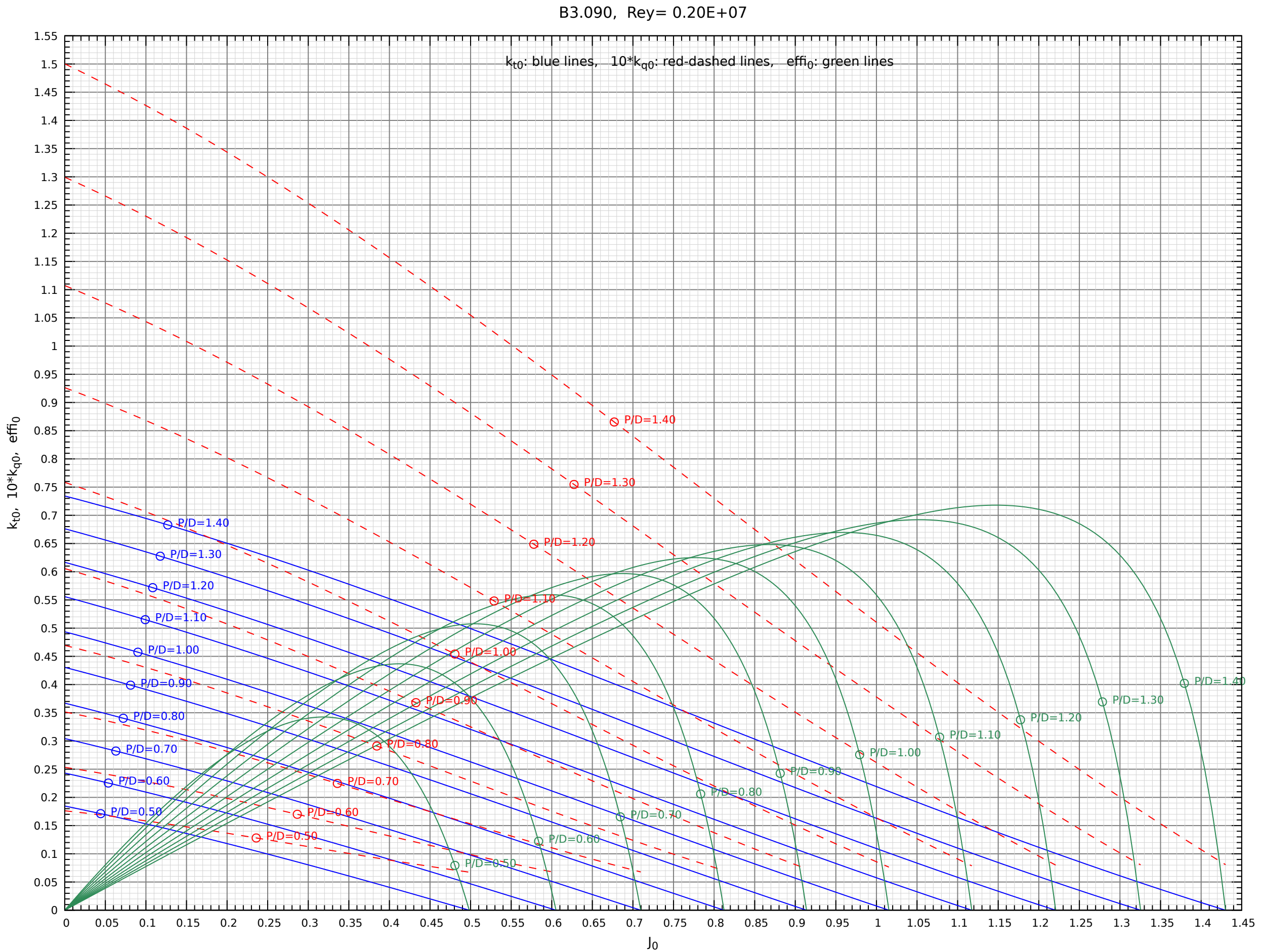
B3.090, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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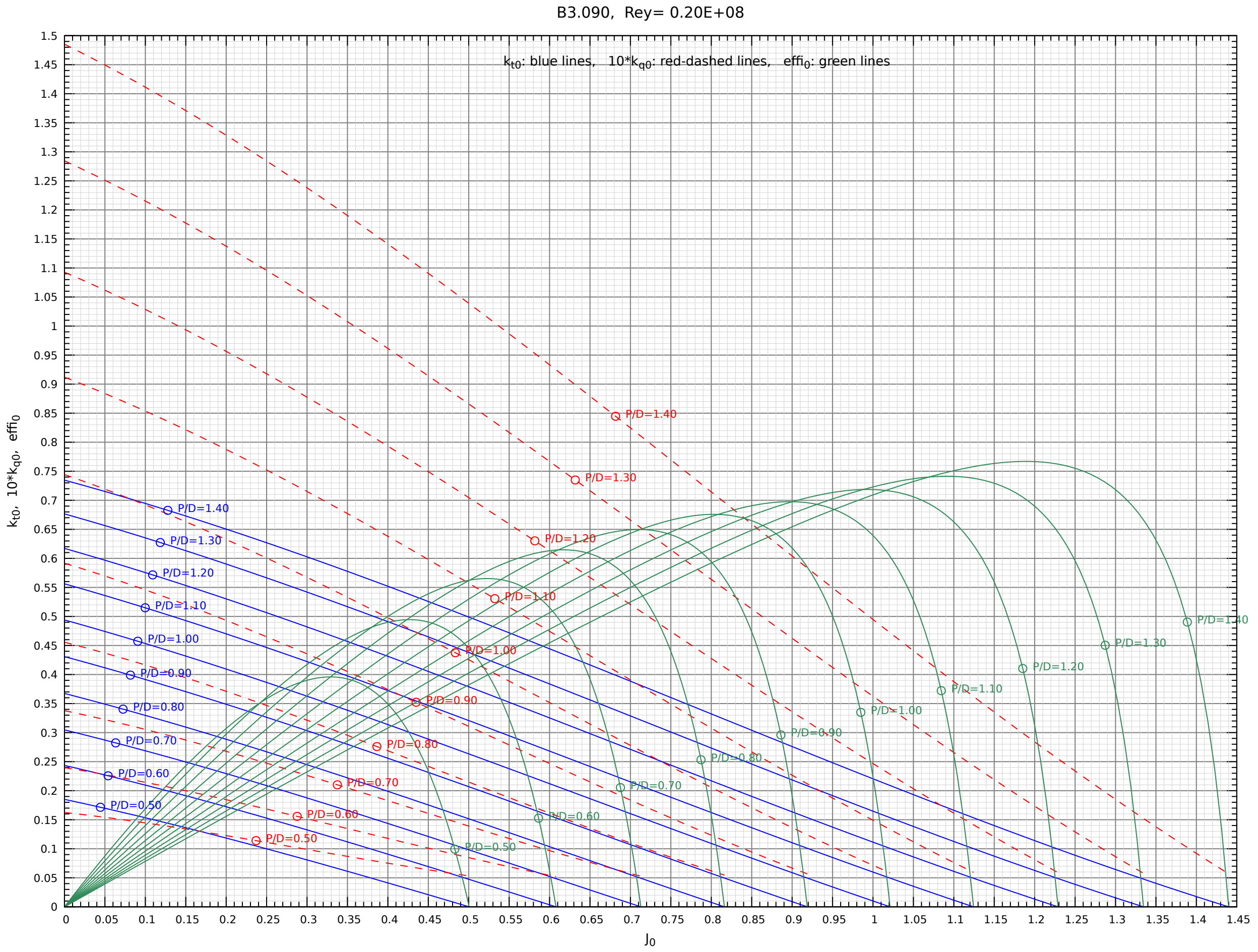
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.090, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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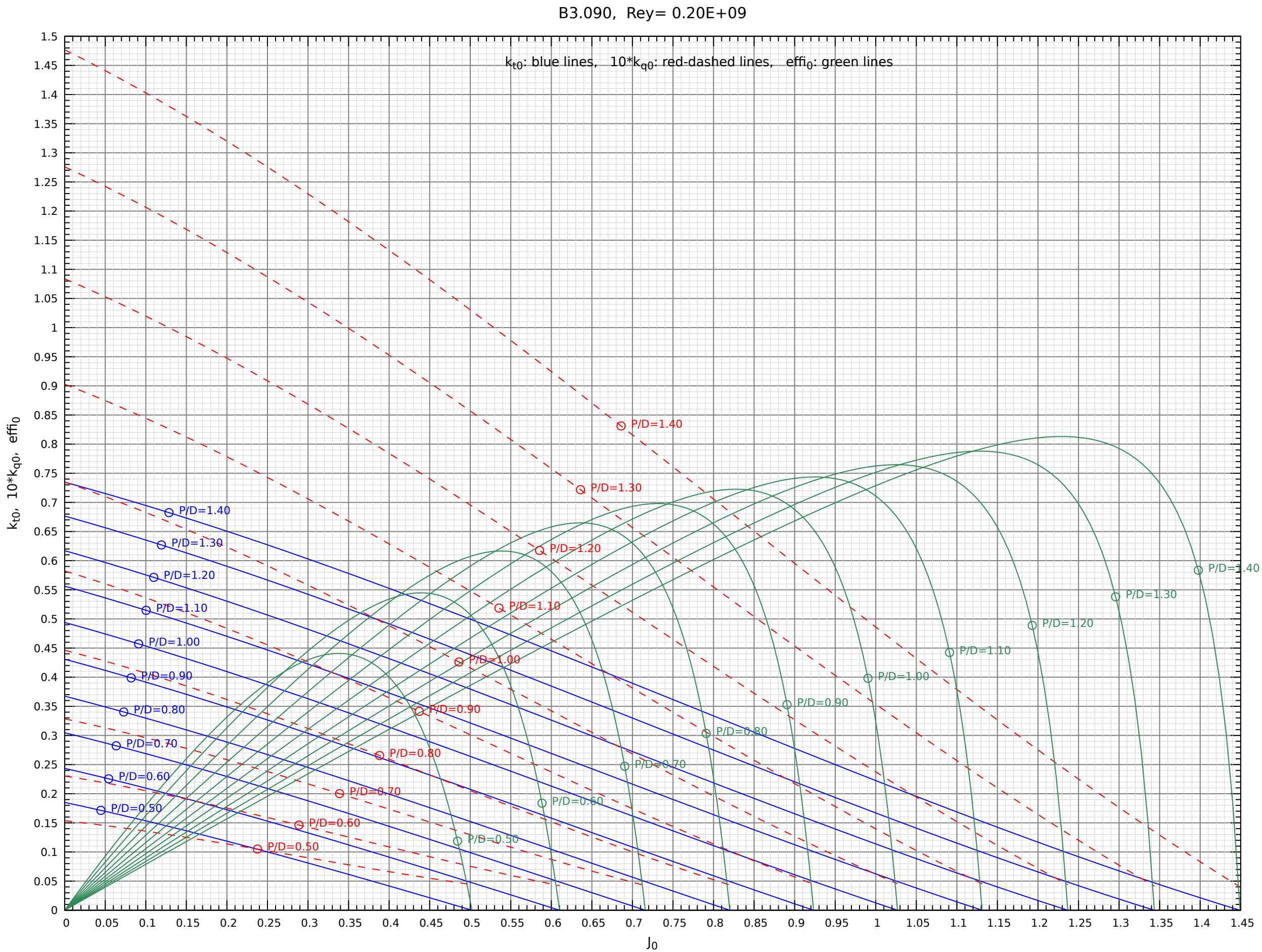
B3.090, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
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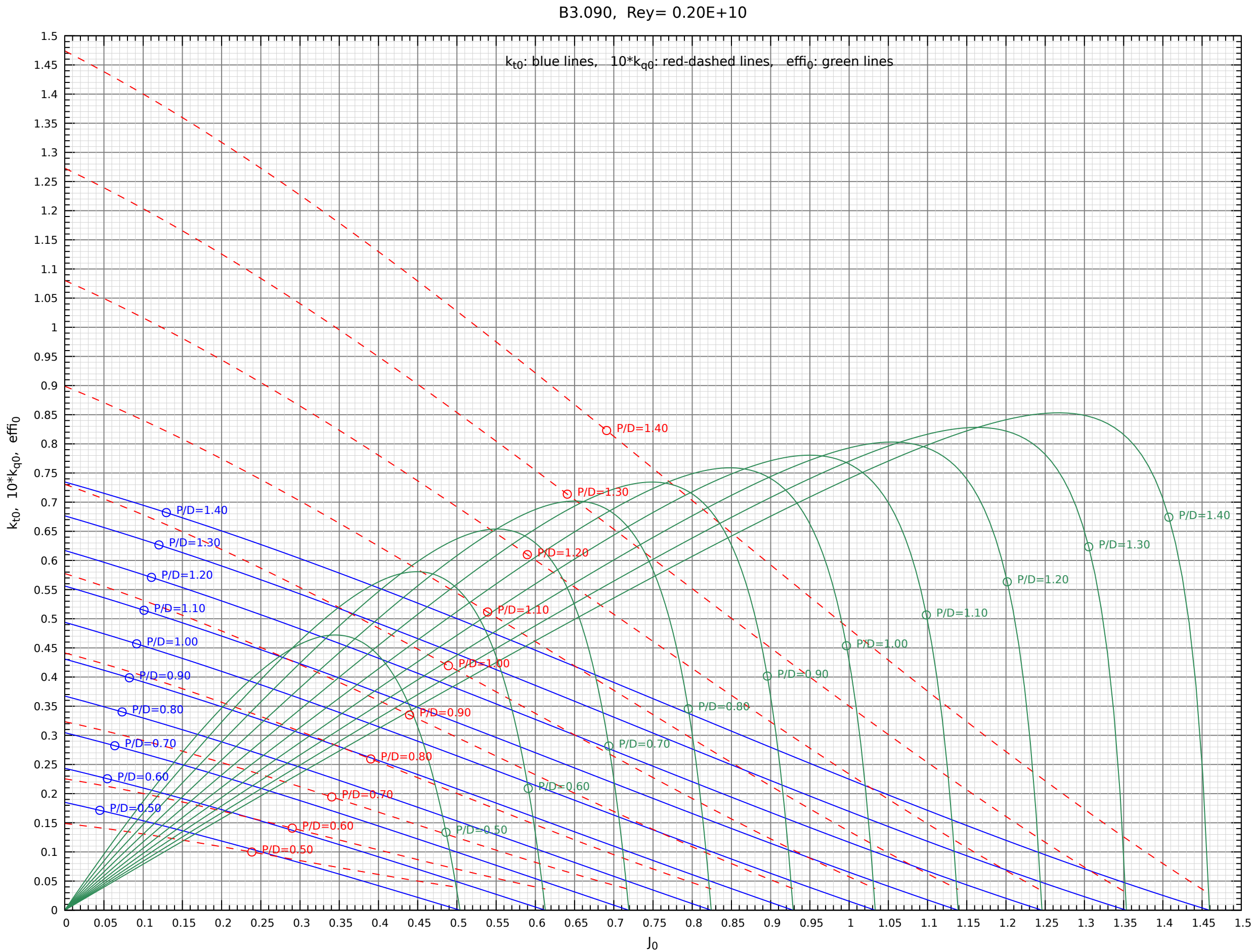
P/D=0.60
P/D=0.50


B3.090, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
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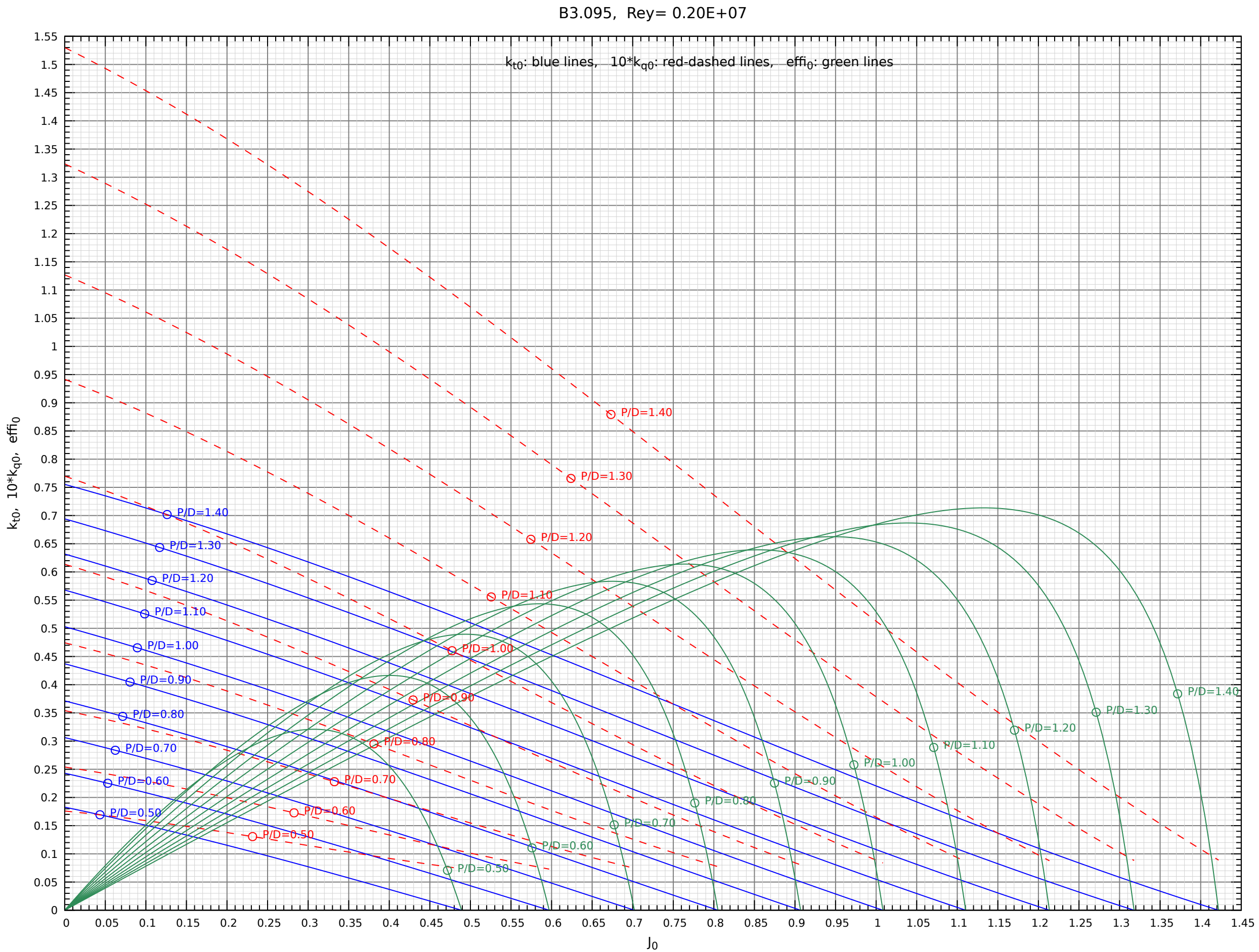
P/D=0.60
P/D=0.50


B3.095, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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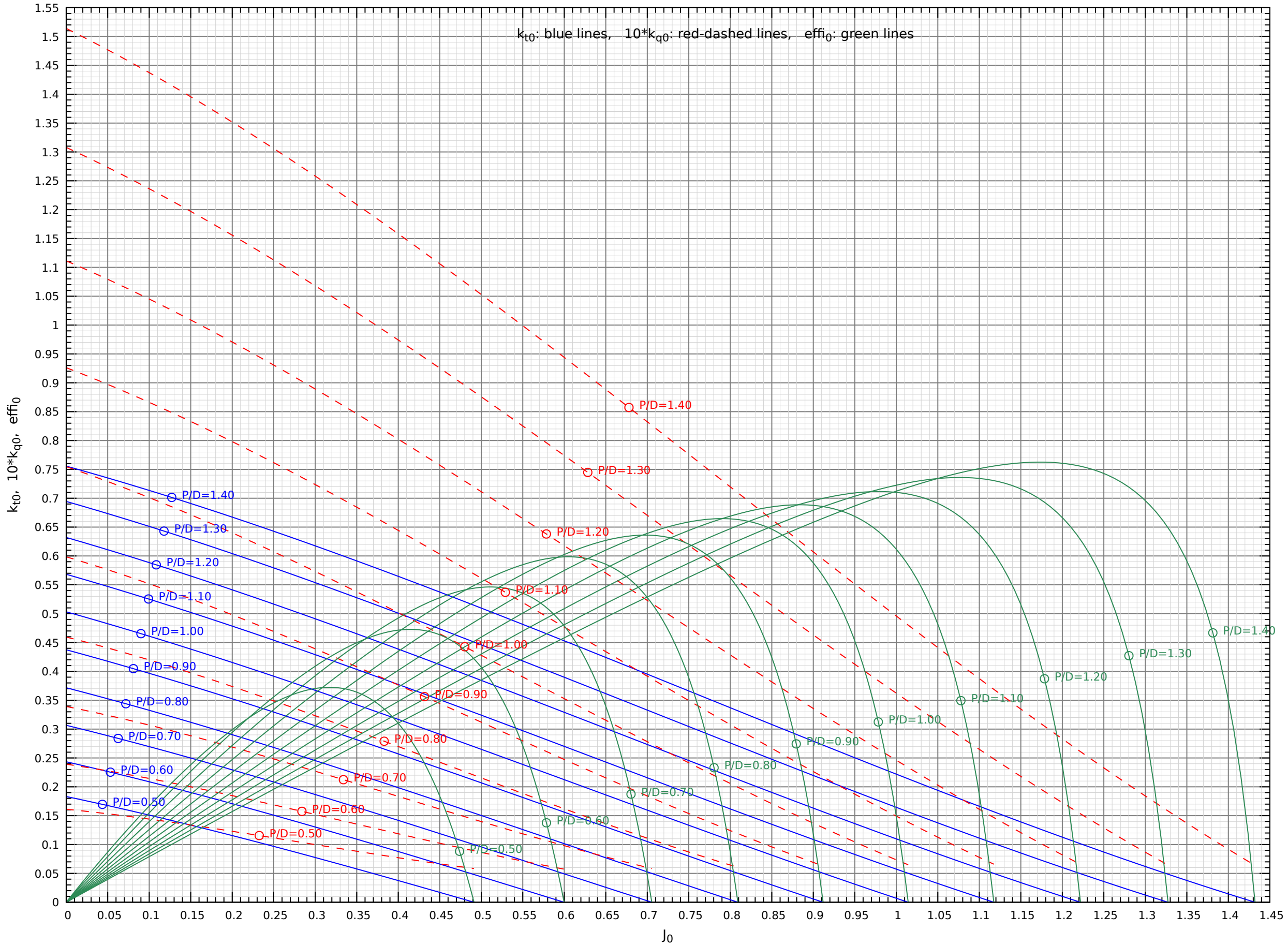
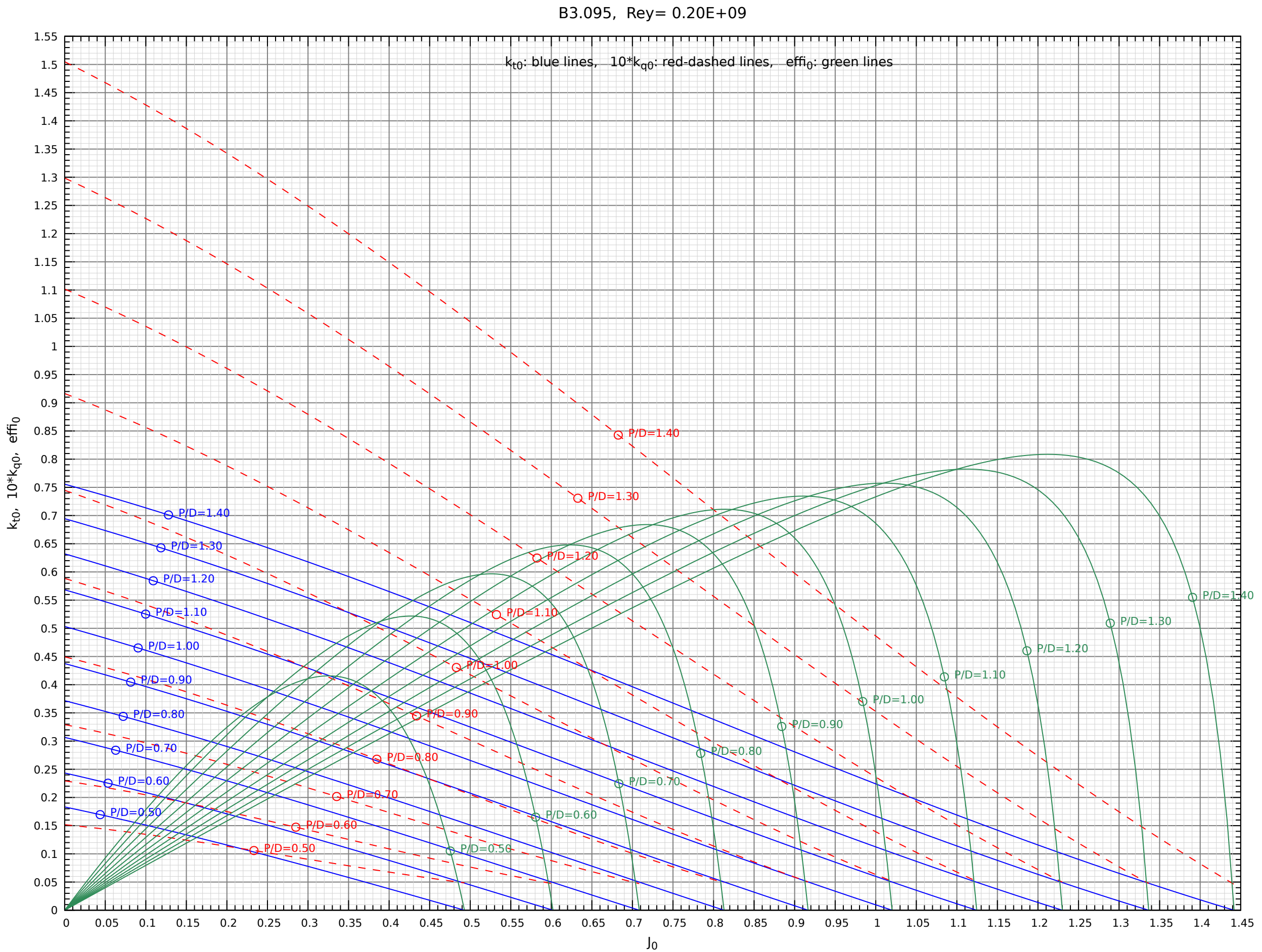
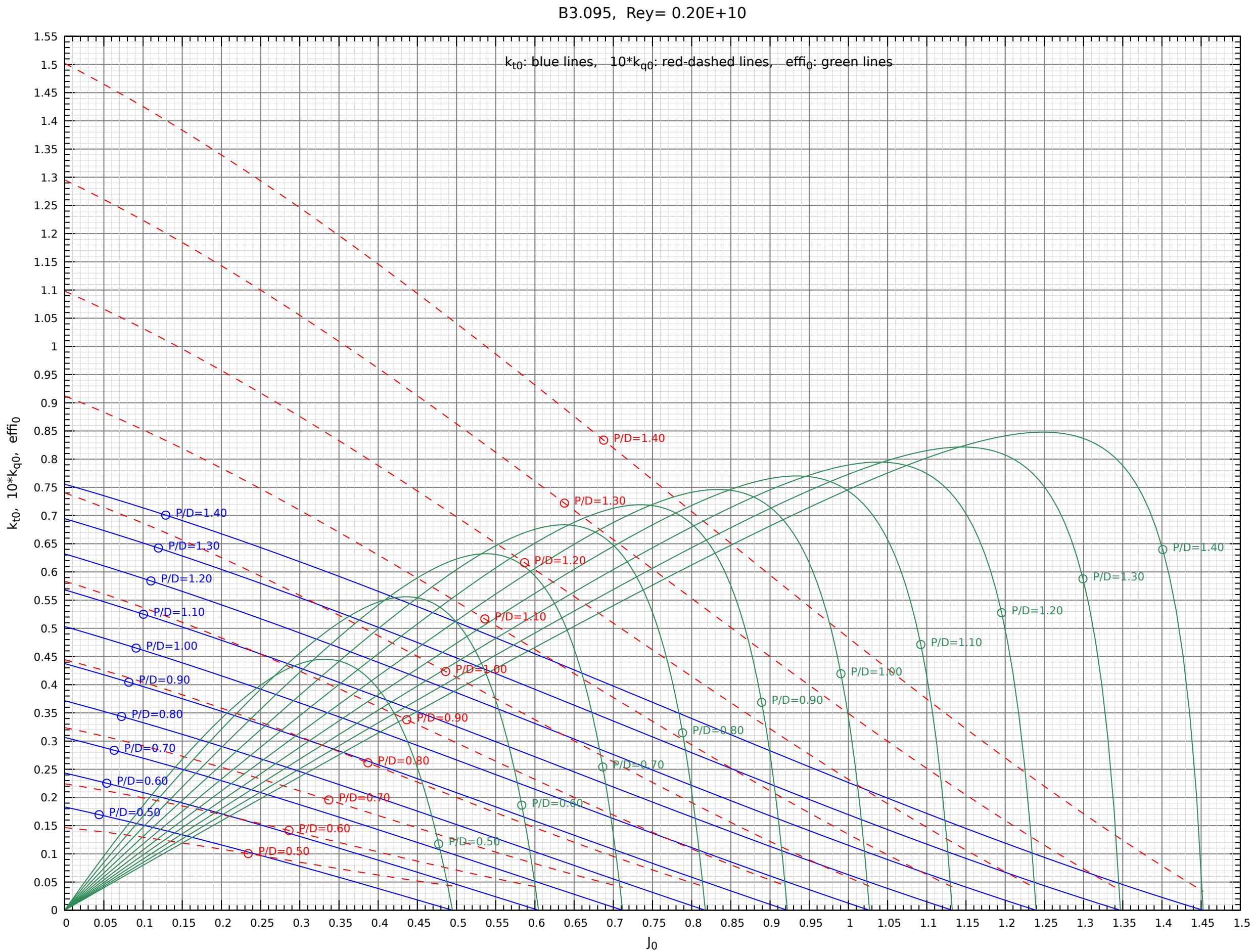
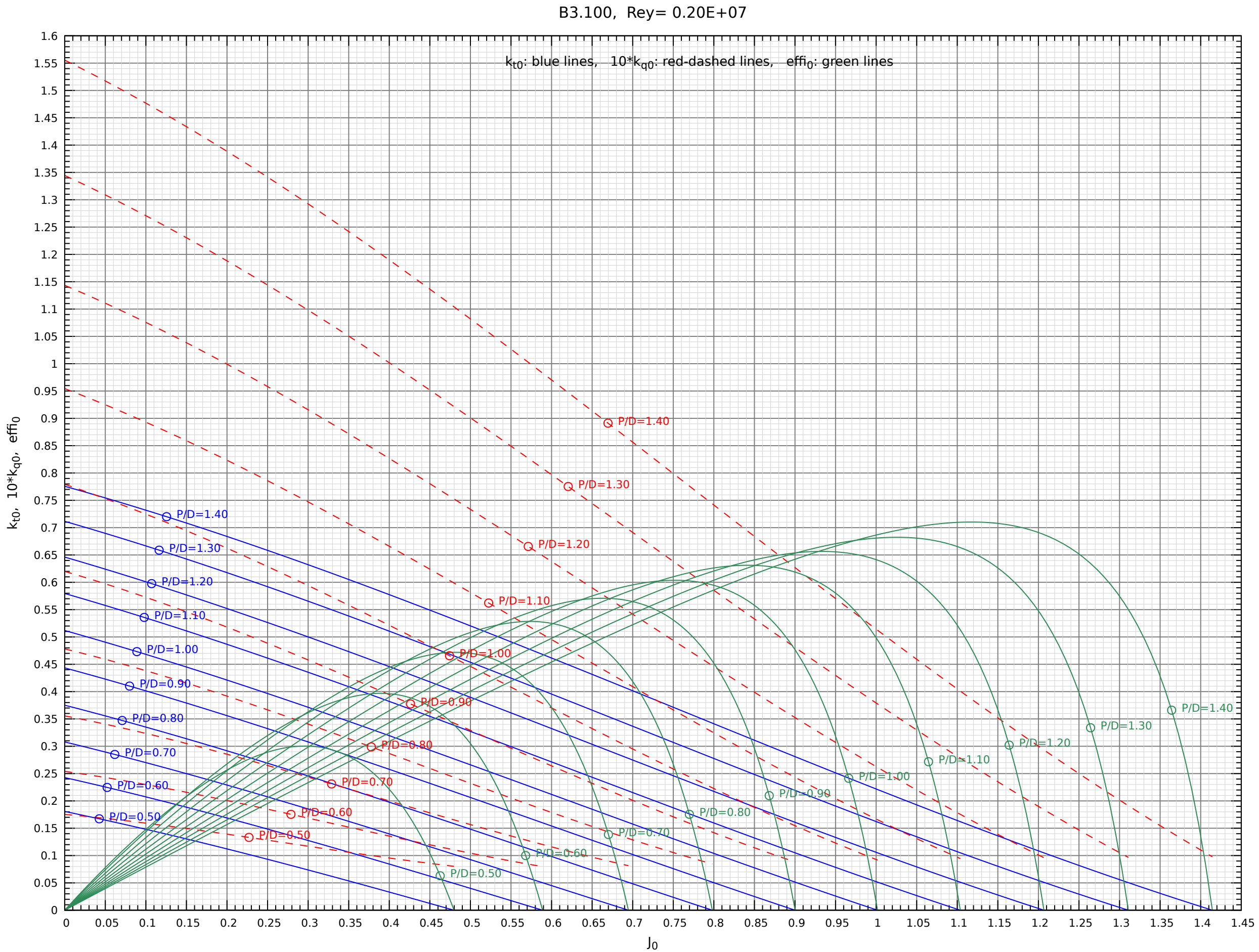
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

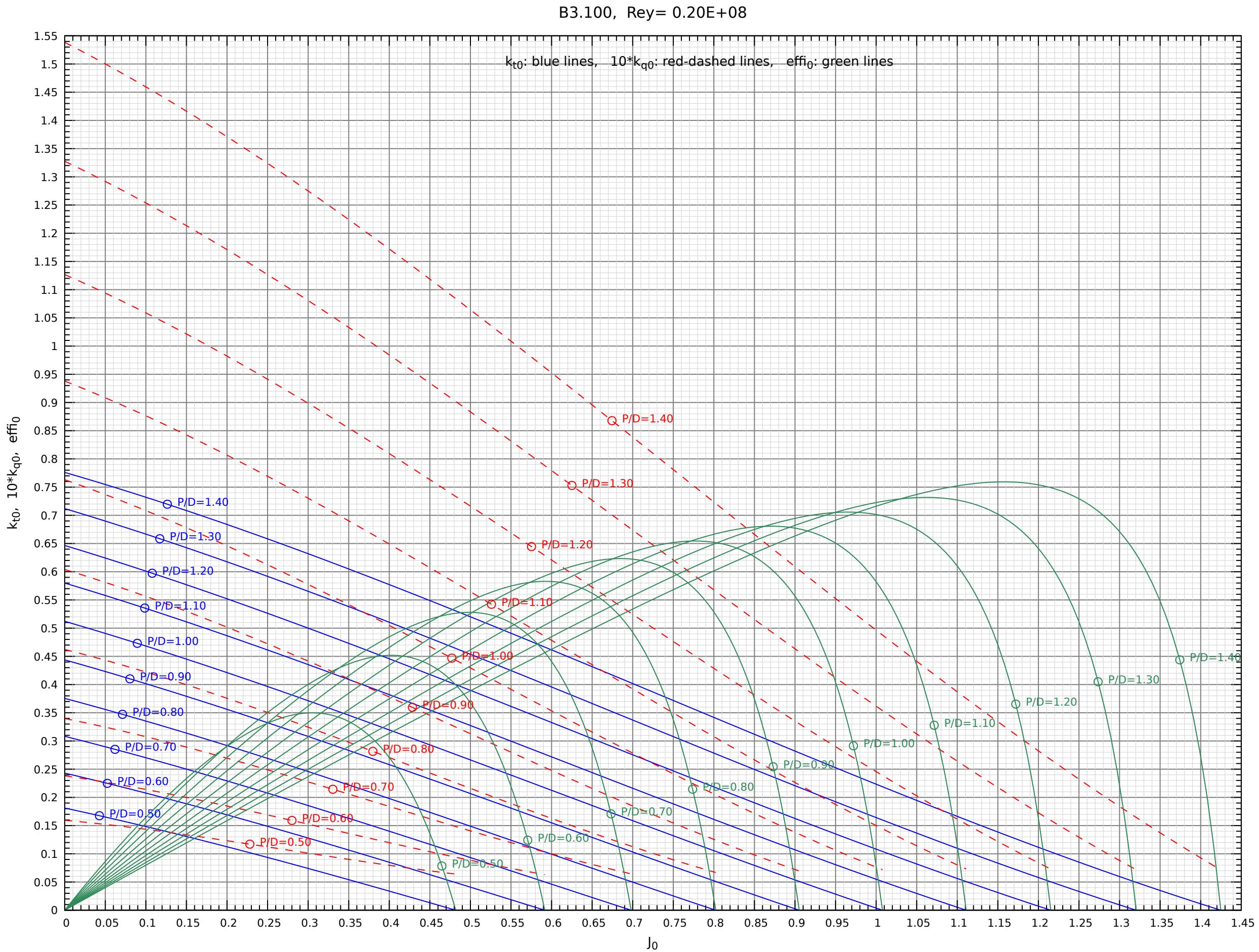
B3.095, Rey= 0.20E+08



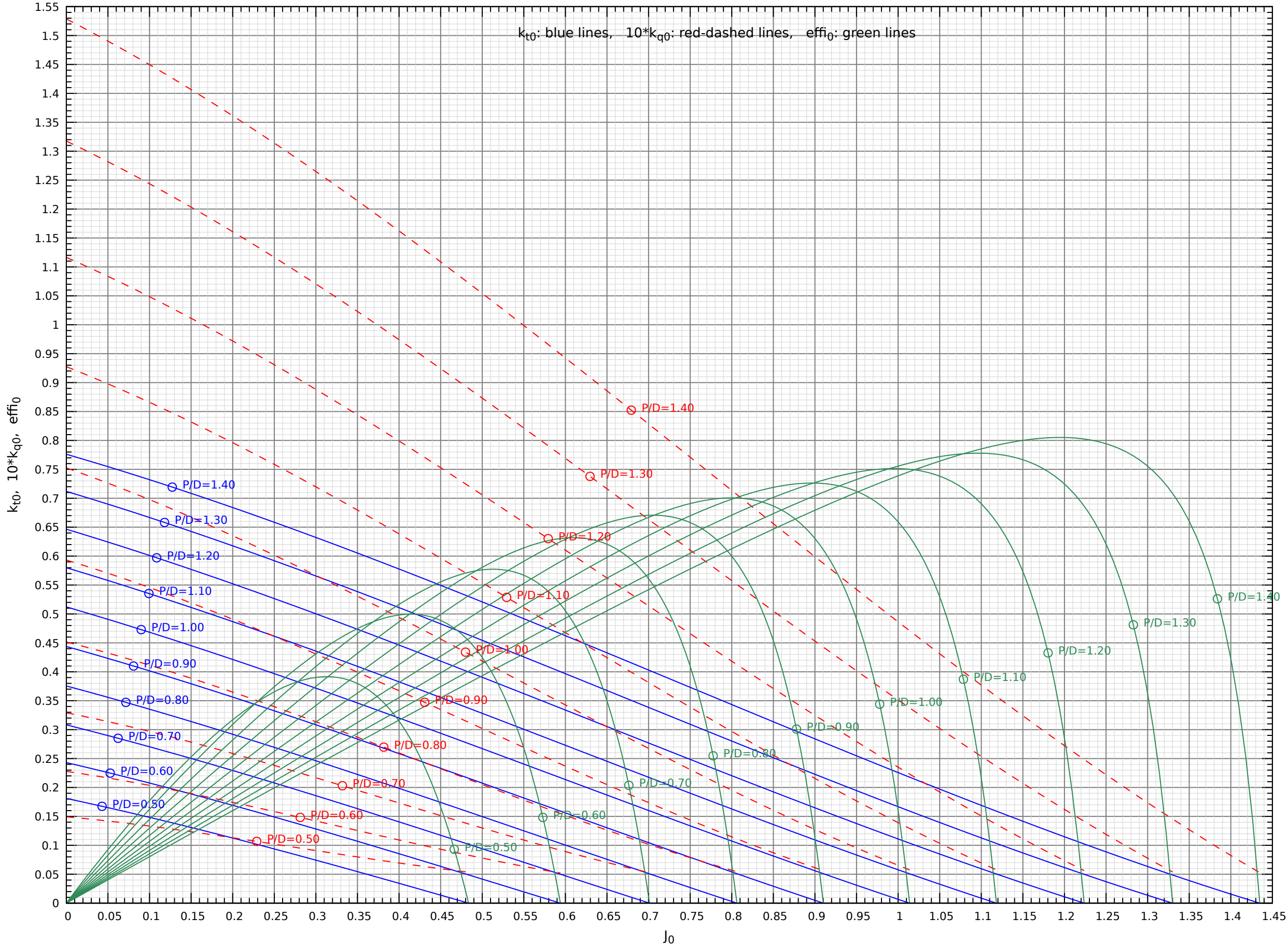

B3.095, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.095, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

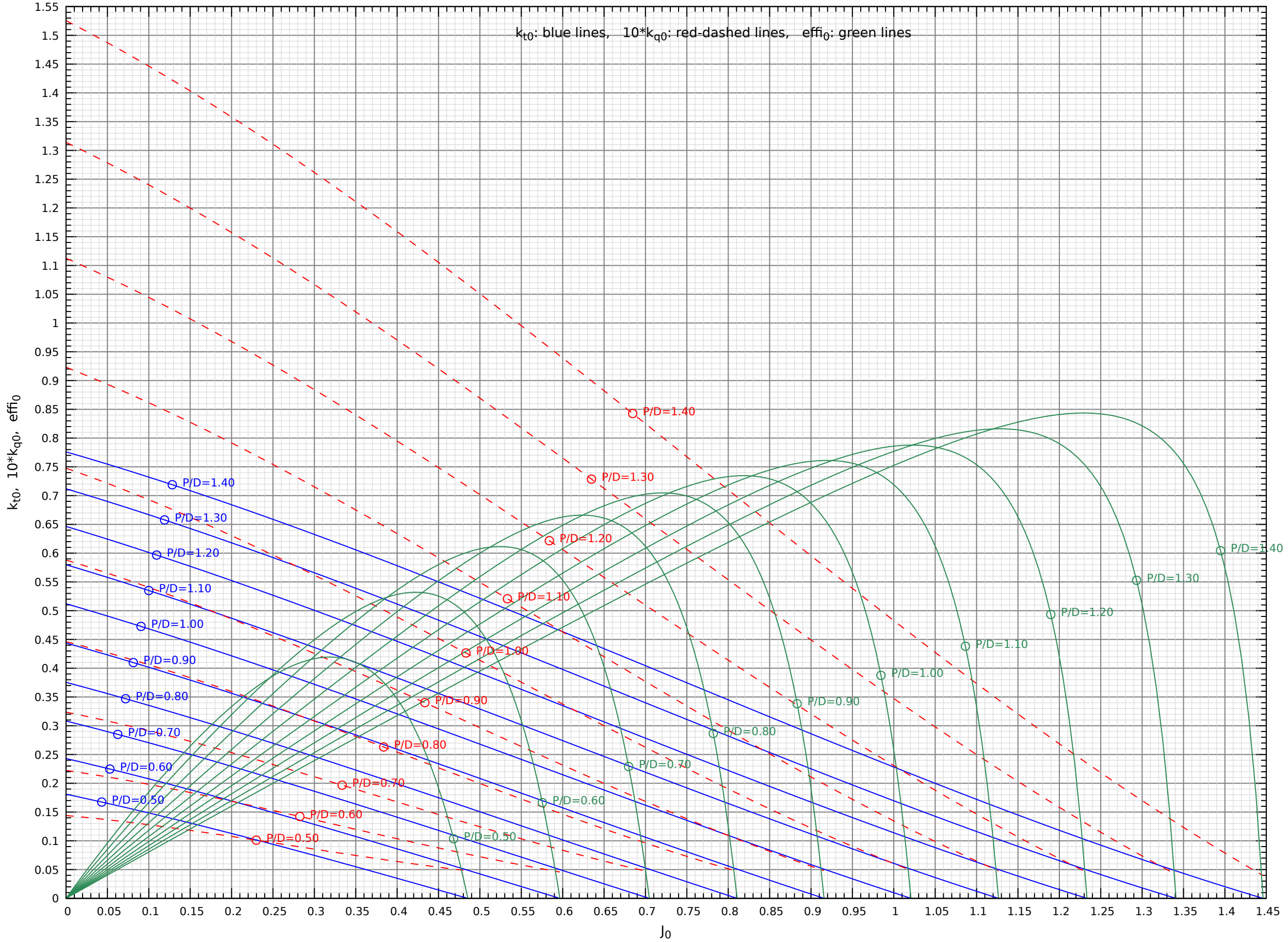

B3.100, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

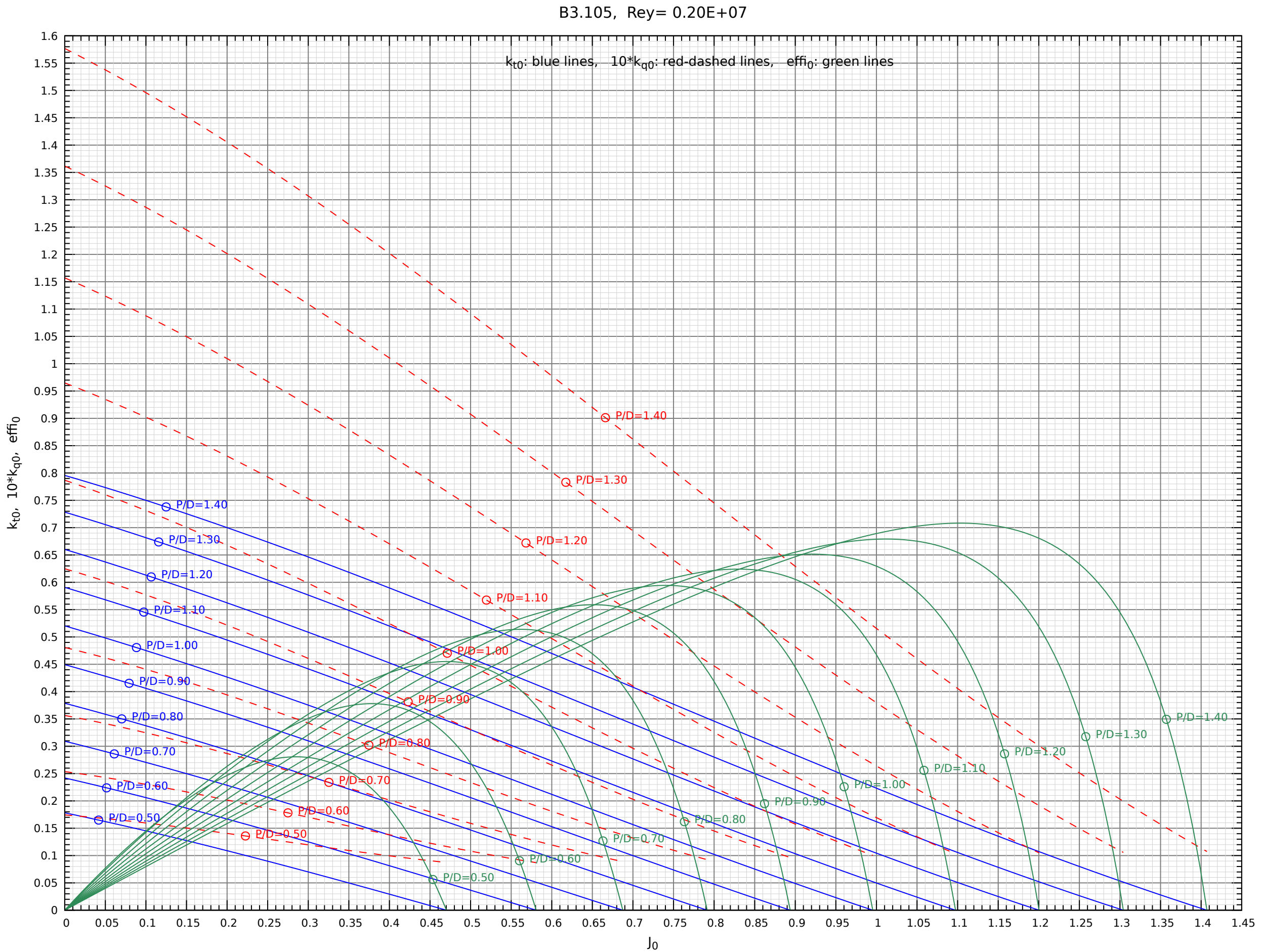

B3.100, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B3.100, Rey= 0.20E+09



B3.100, Rey= 0.20E+10




B3.105, Rey= 0.20E+07
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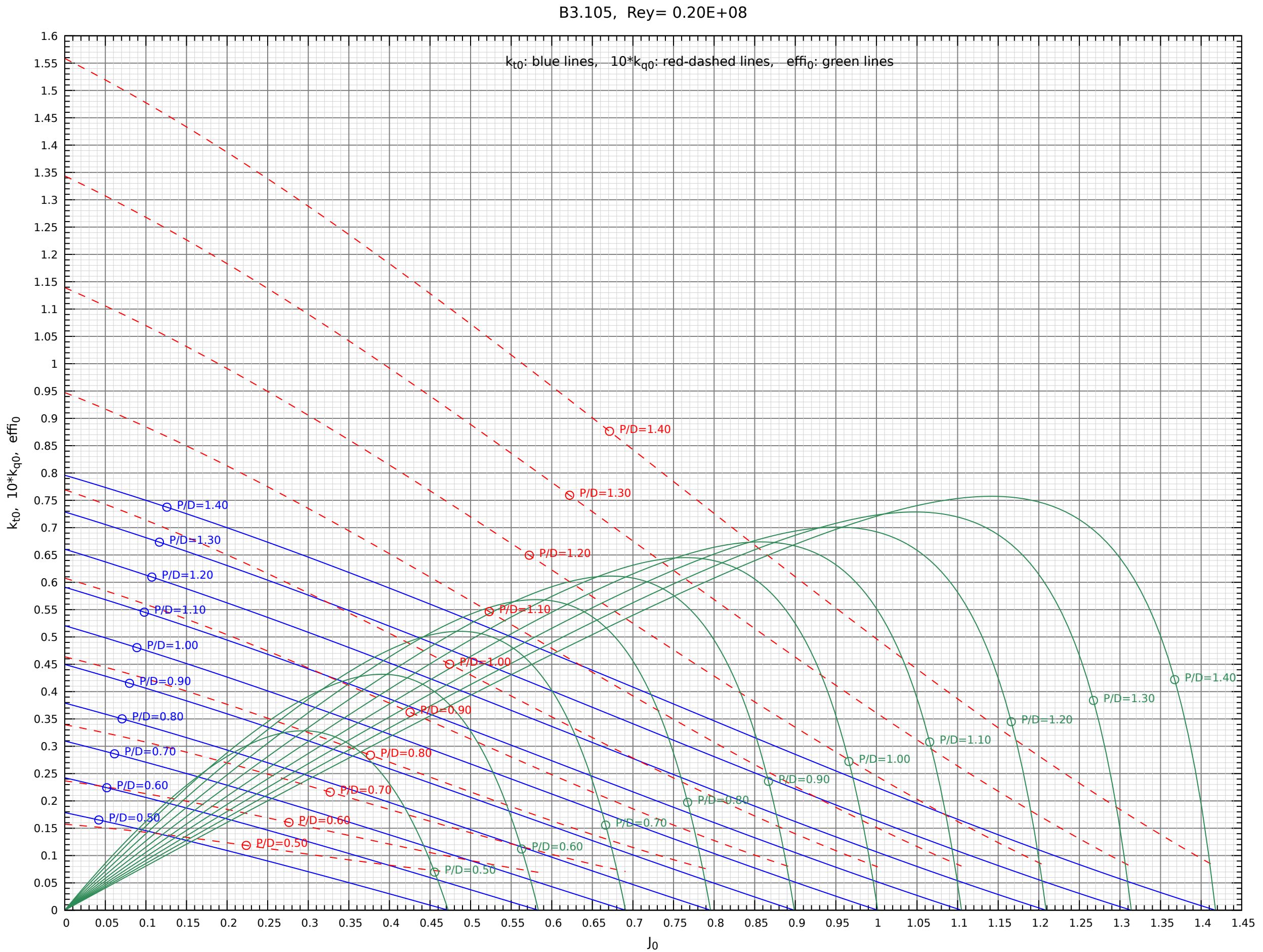
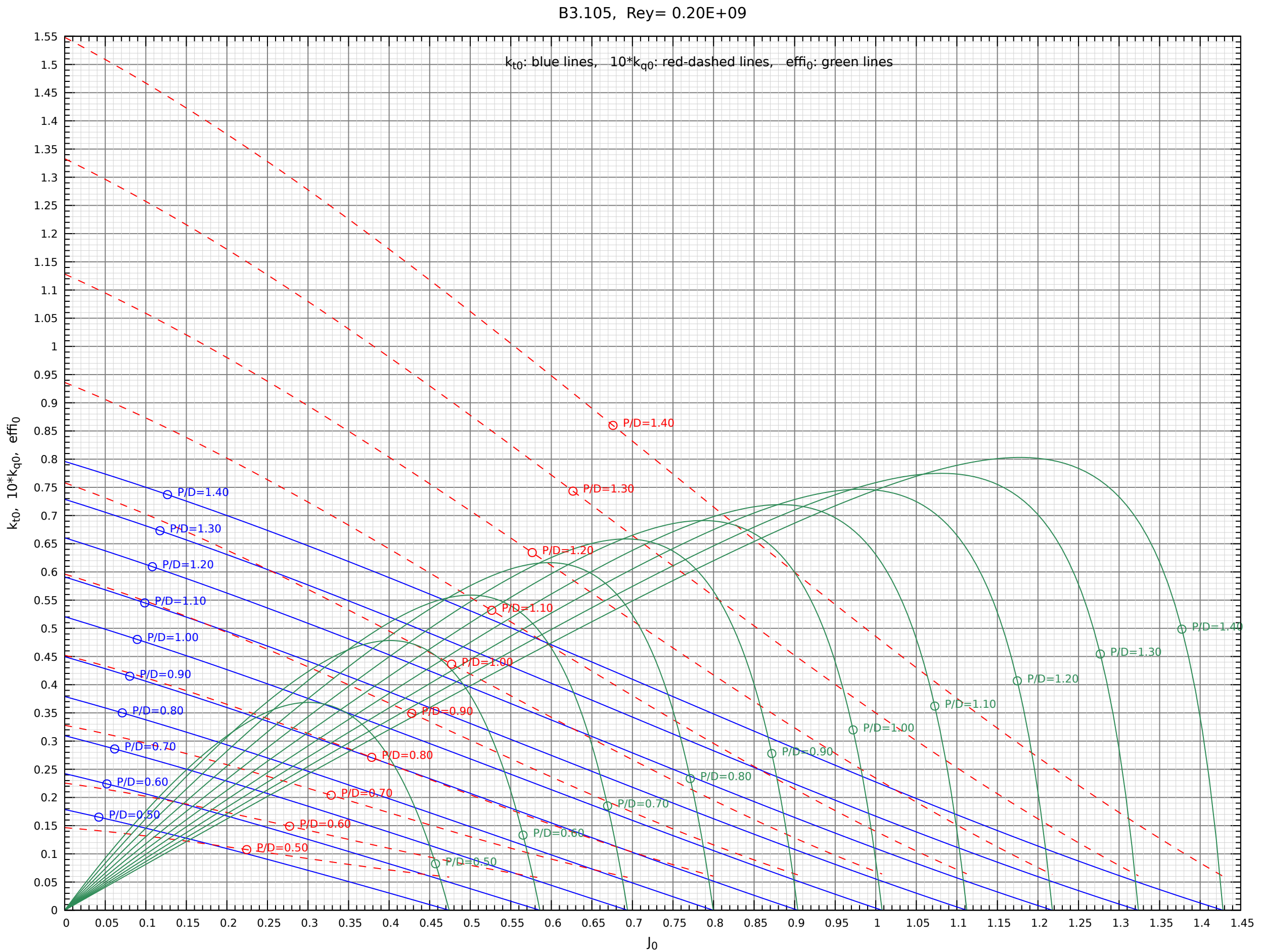
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.105, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B3.105, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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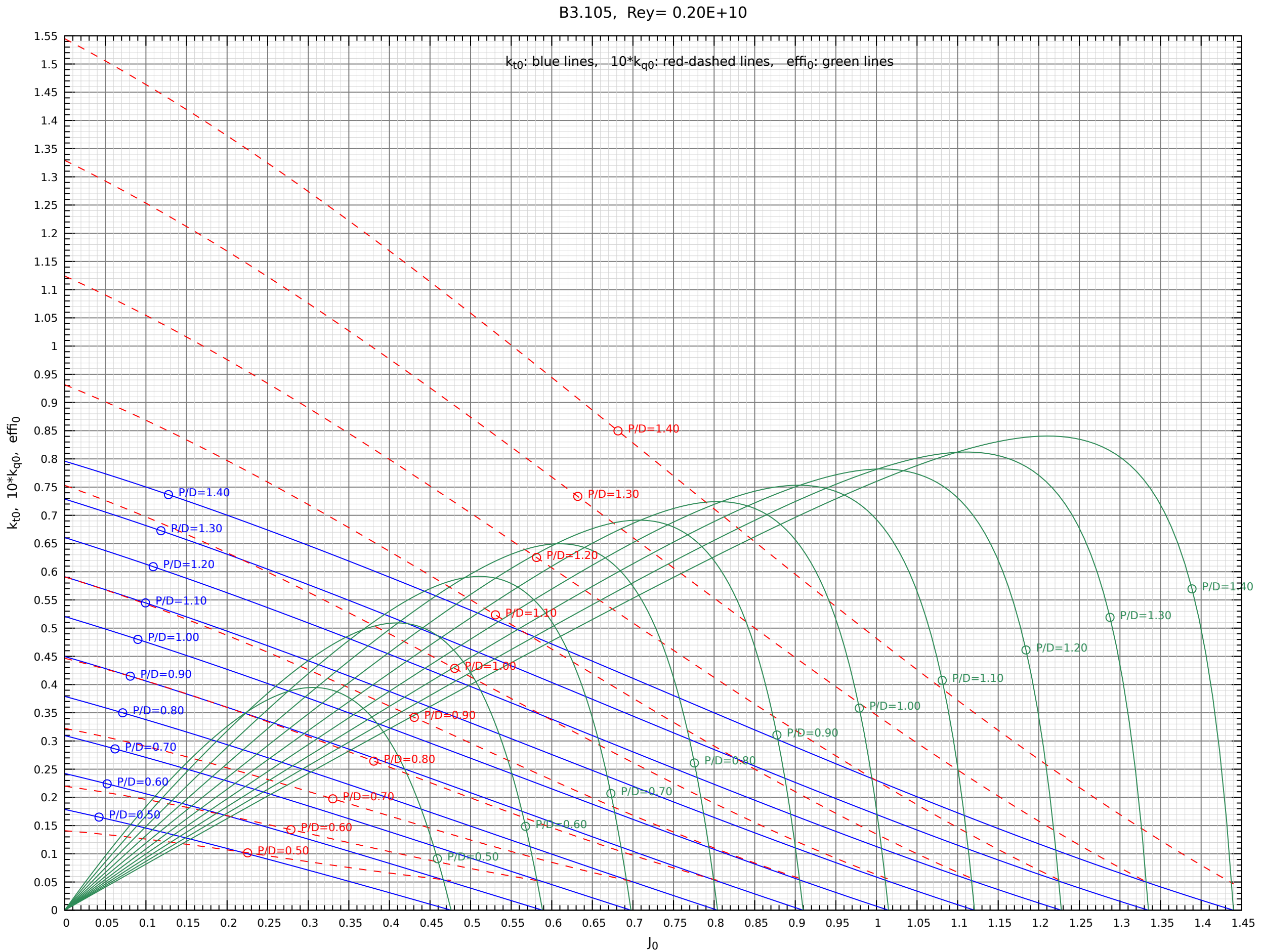
P/D=0.60
P/D=0.50


B3.105, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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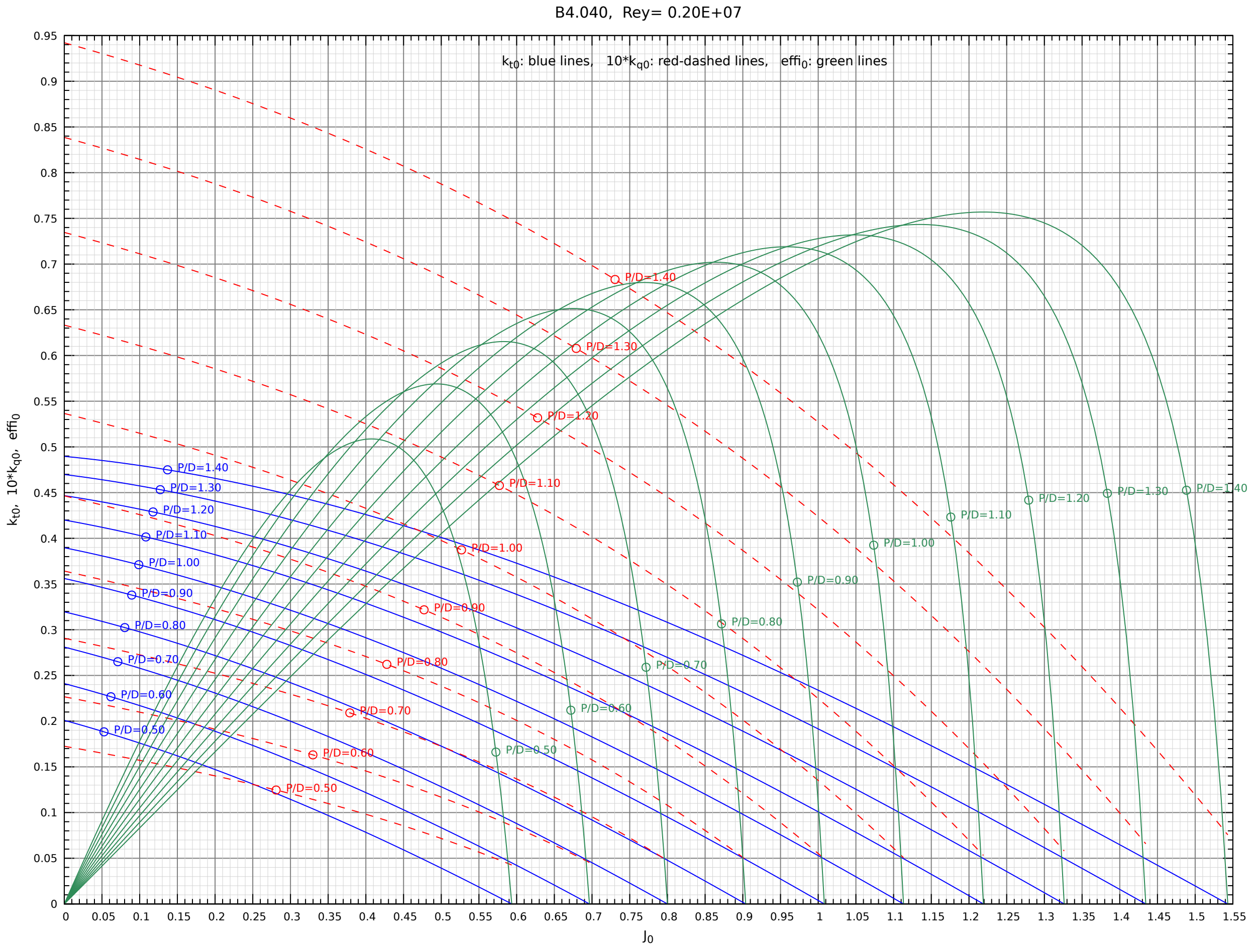
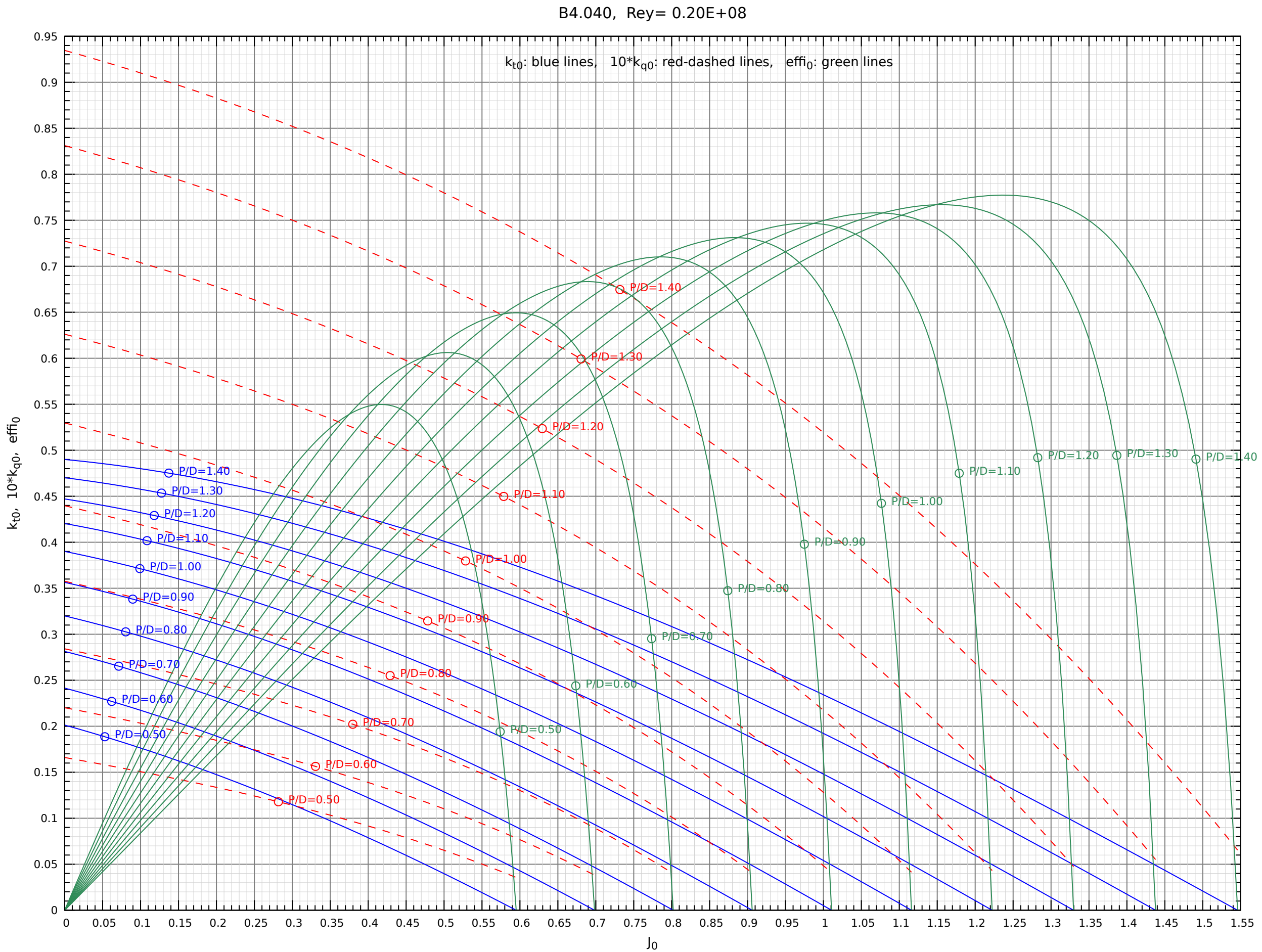
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.040, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.040, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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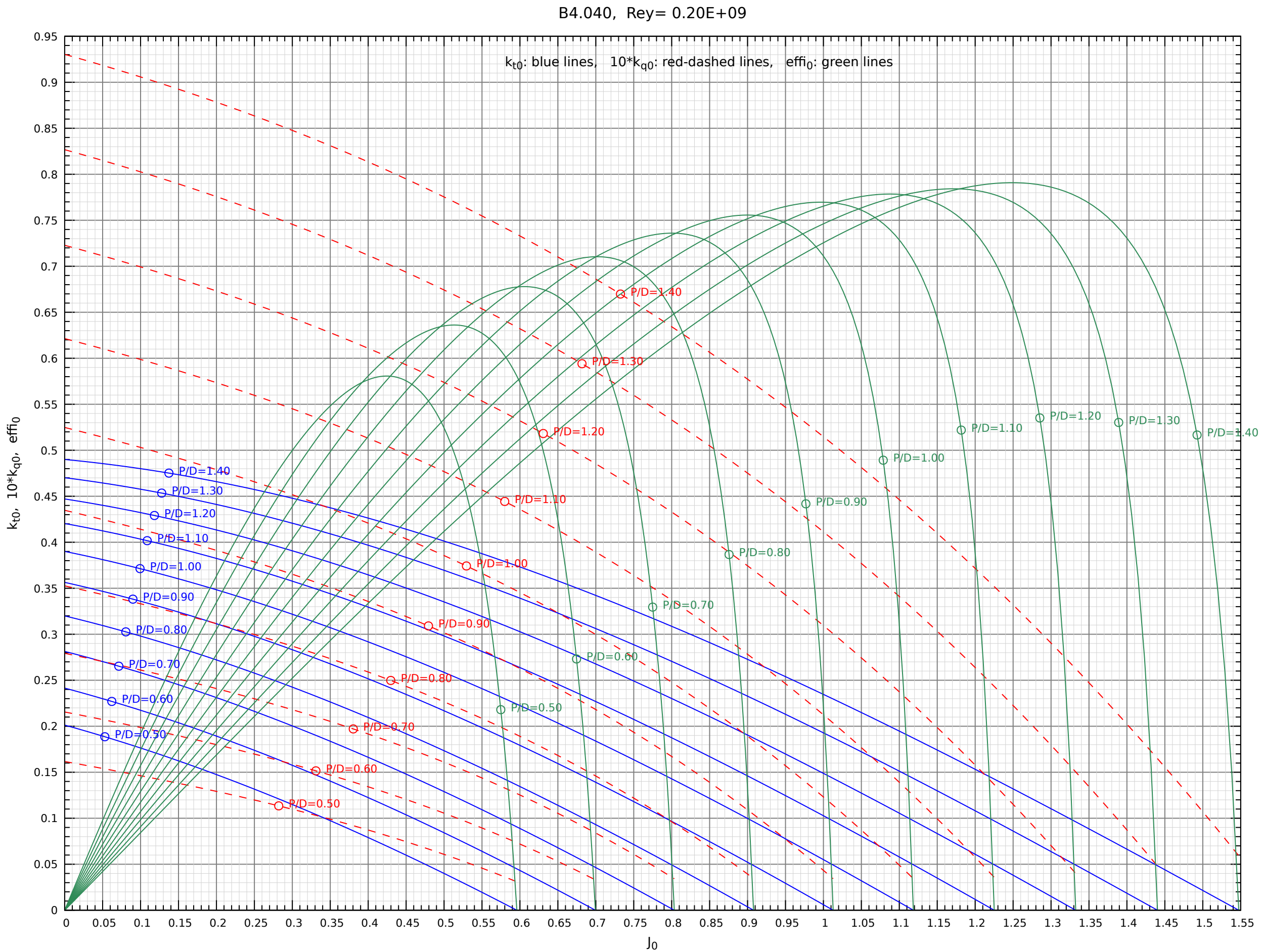
P/D=0.60
P/D=0.50


B4.040, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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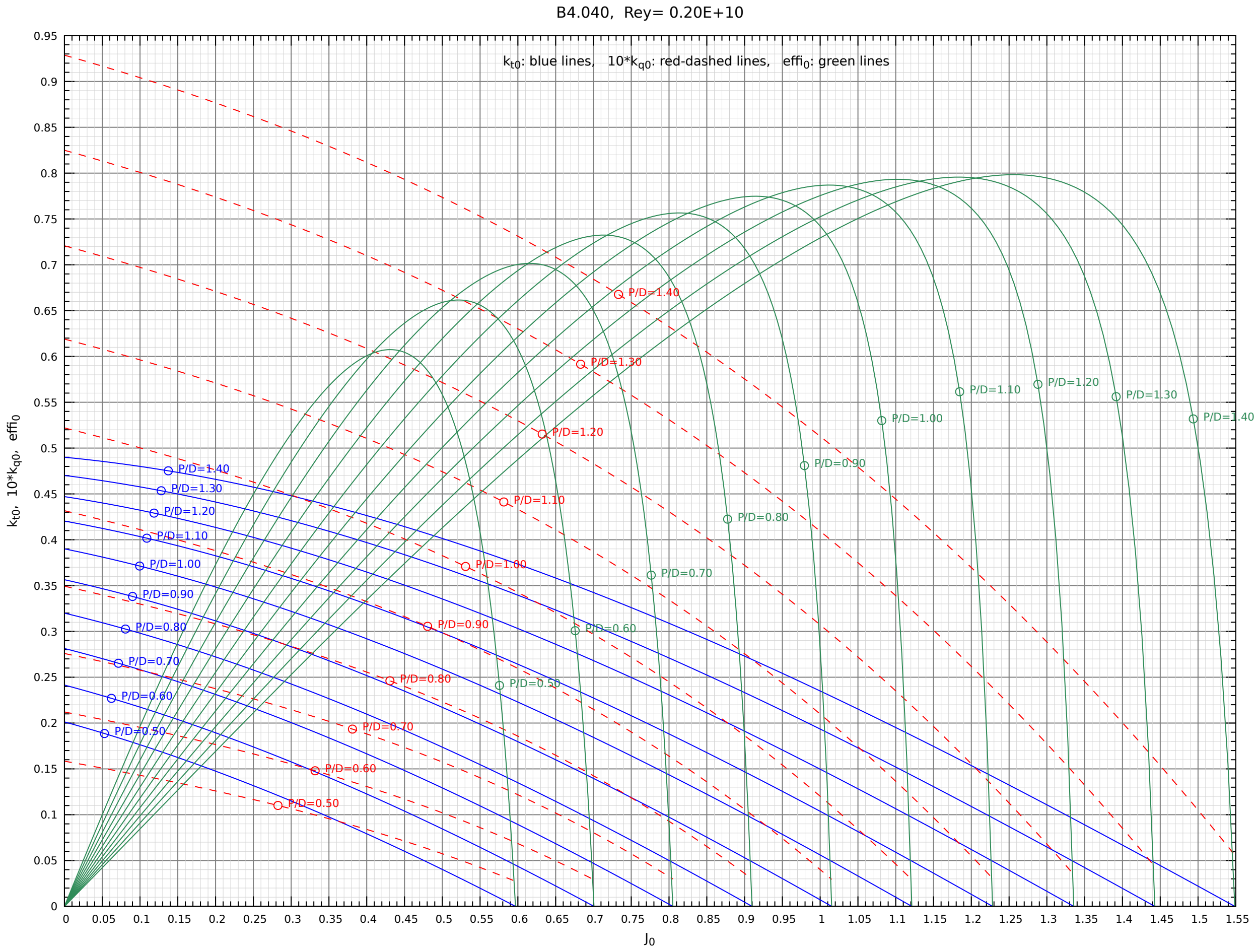
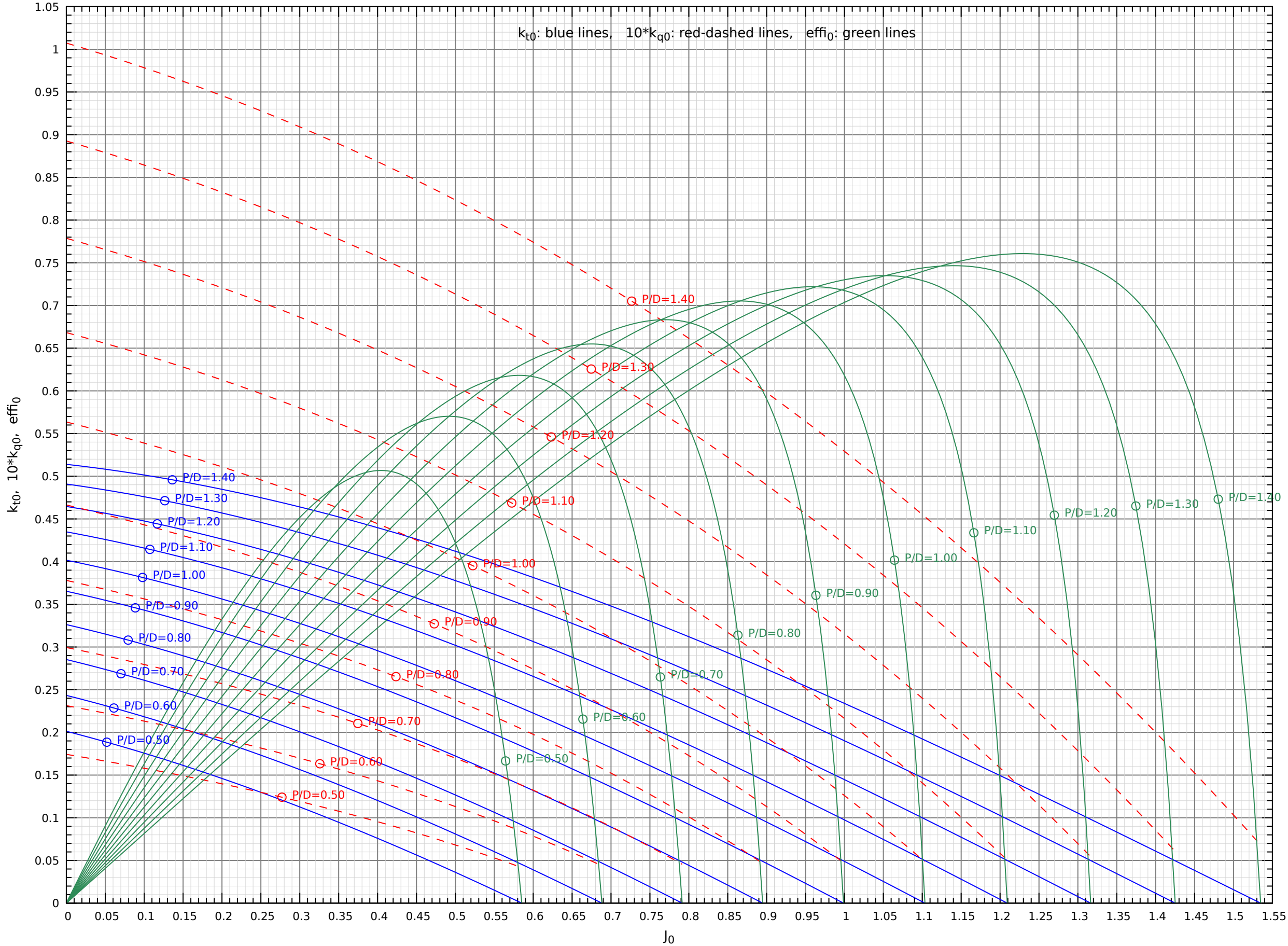
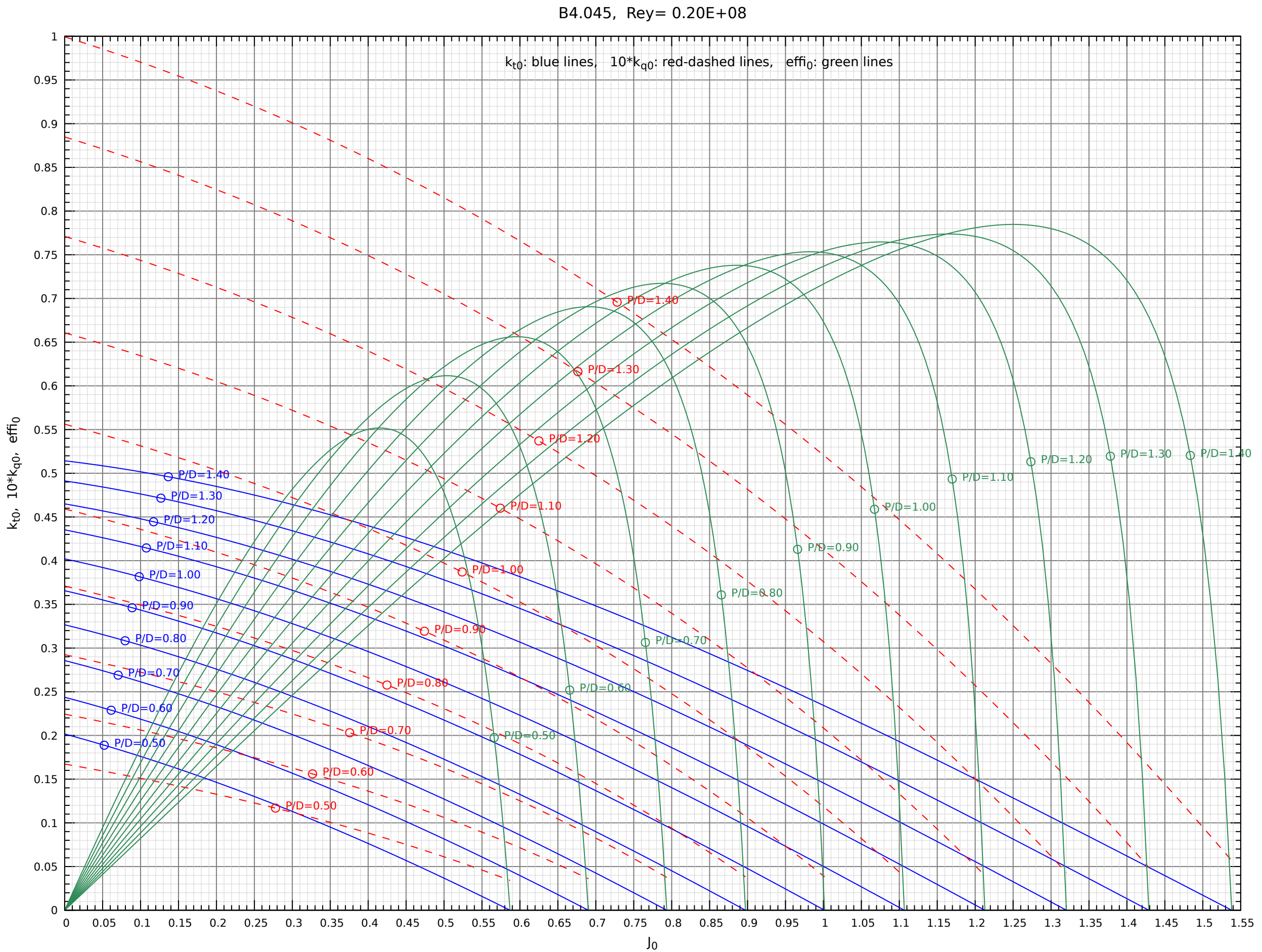
P/D=0.60
P/D=0.50


B4.040, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.045, Rey= 0.20E+07




B4.045, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.90
P/D=0.80
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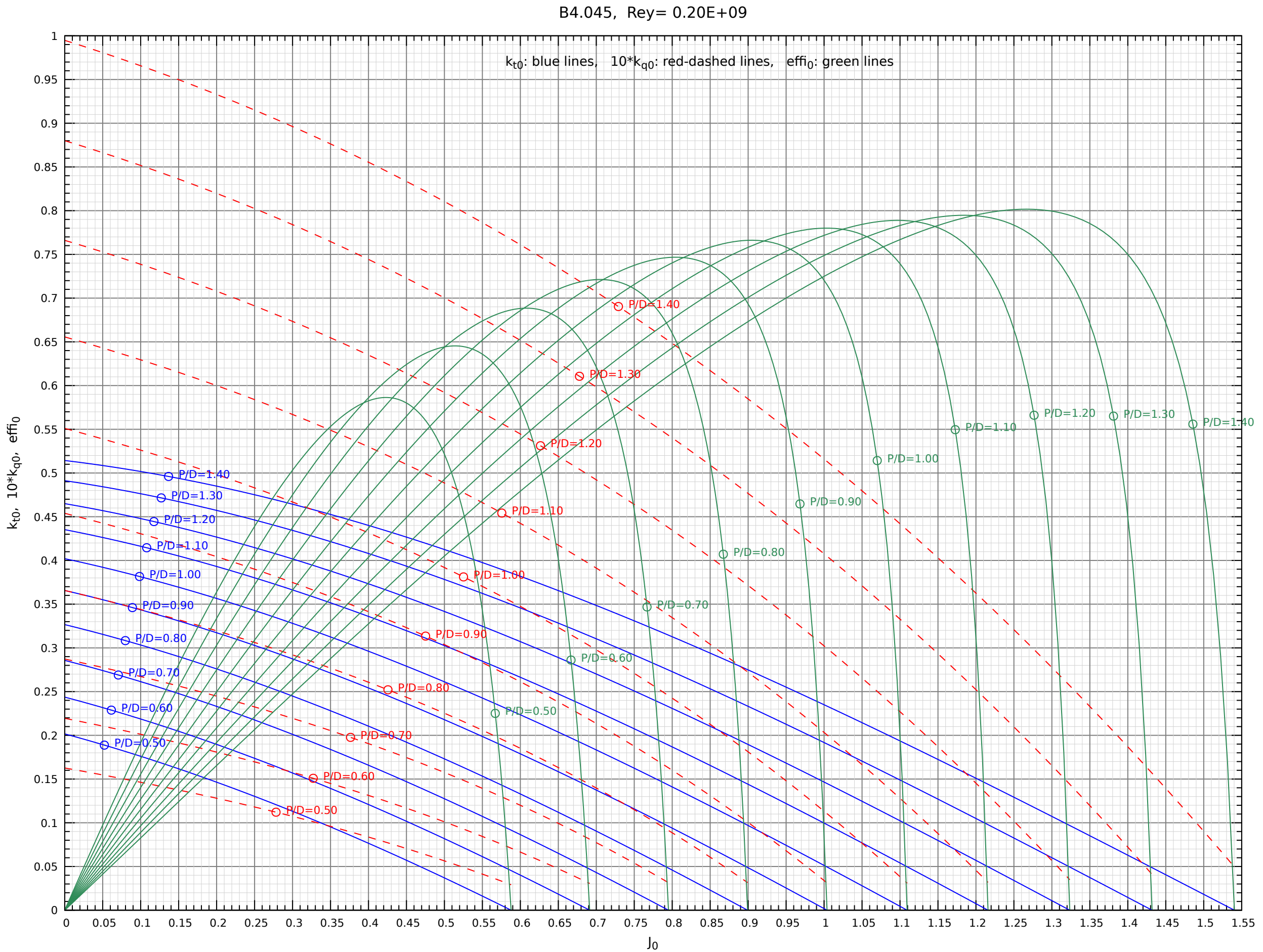
B4.045, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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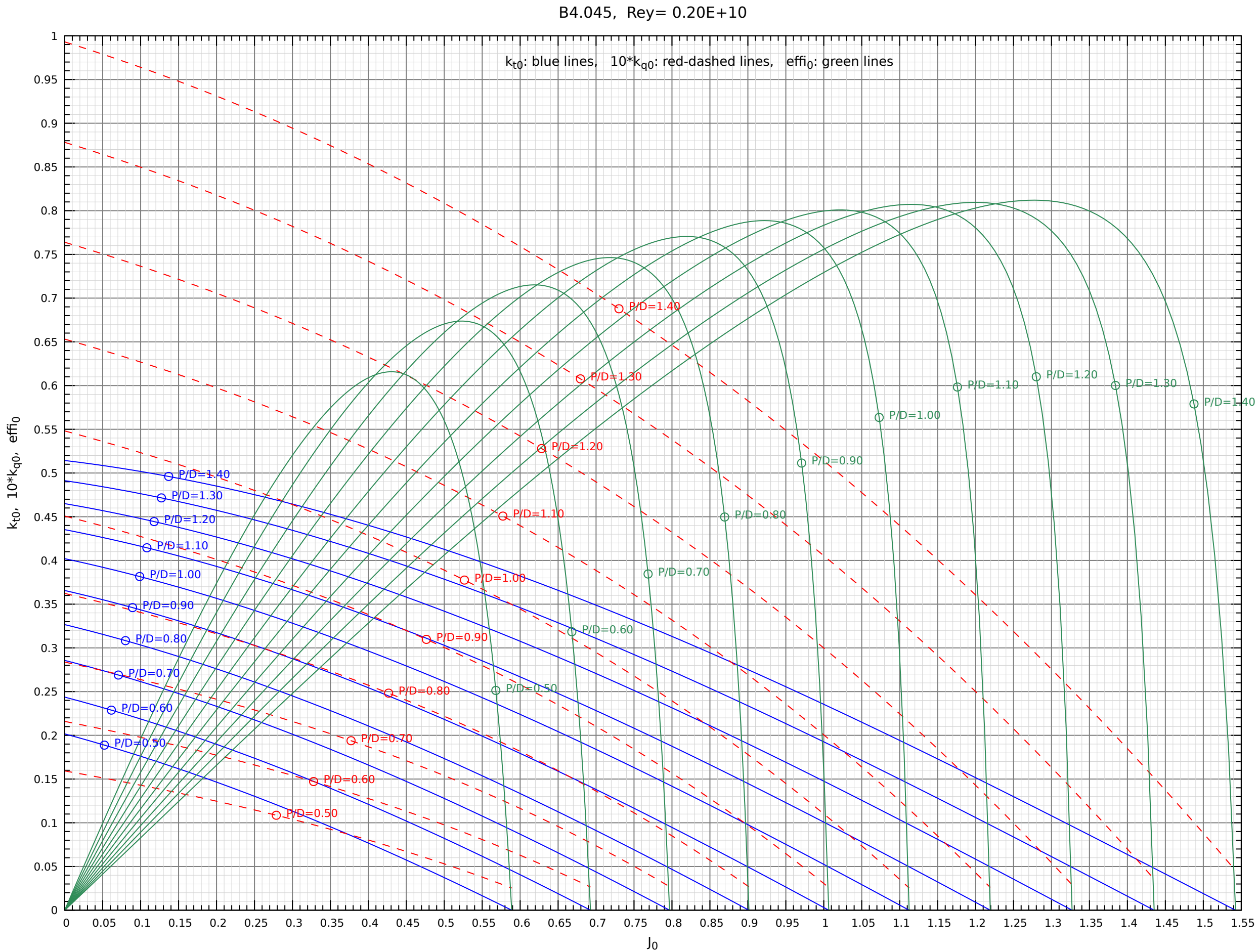
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.045, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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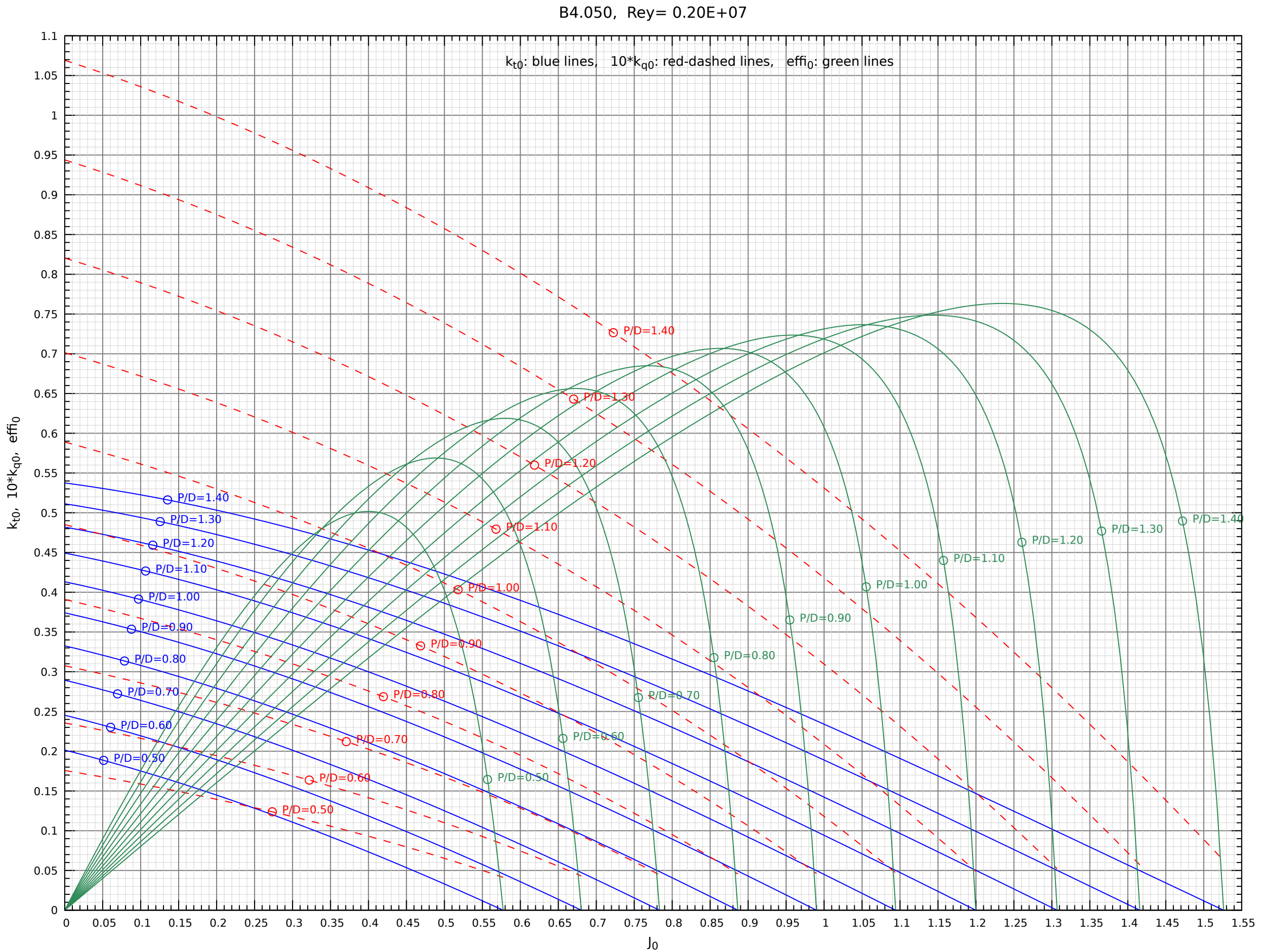
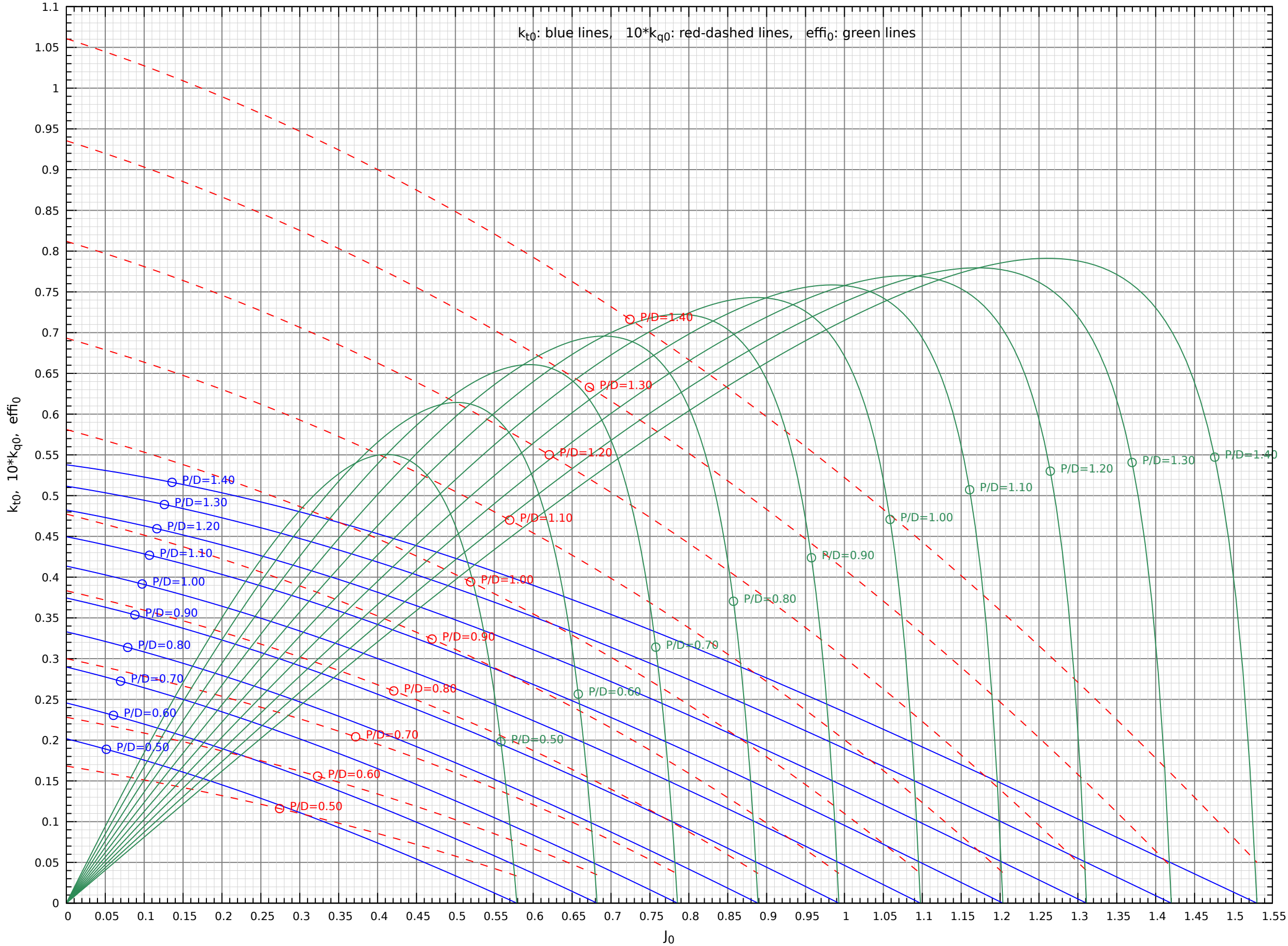
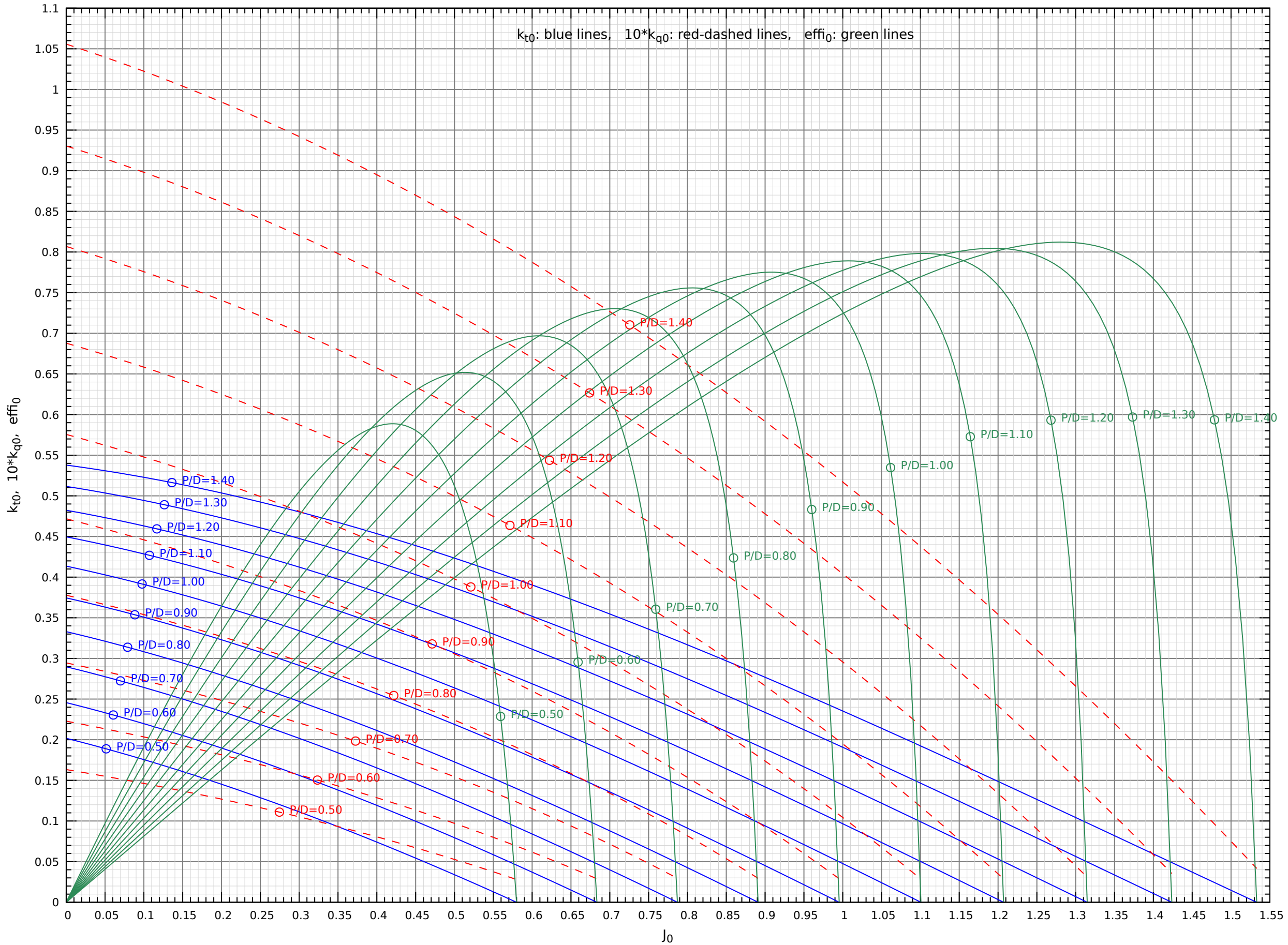
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.050, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

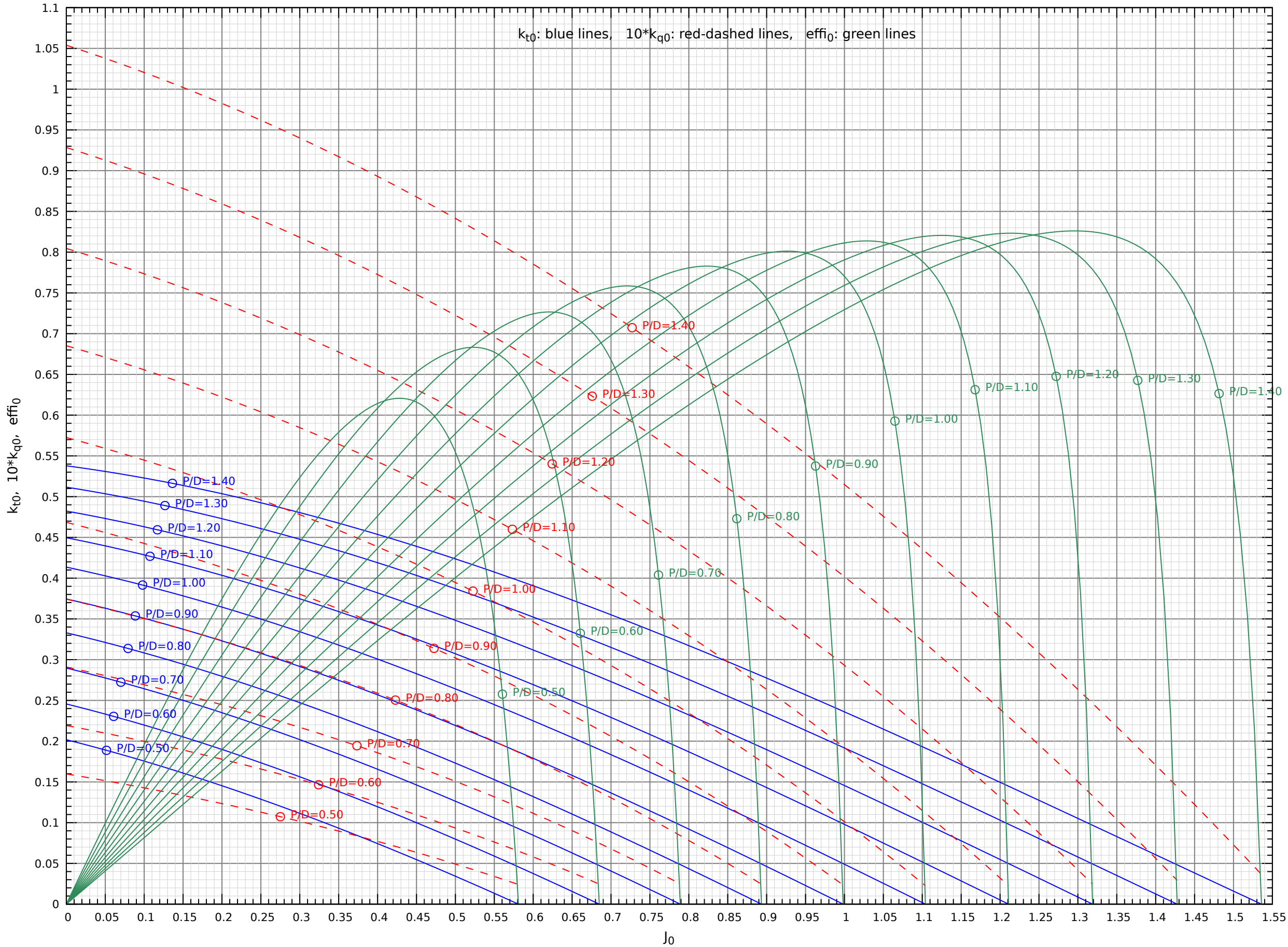
B4.050, Rey= 0.20E+08



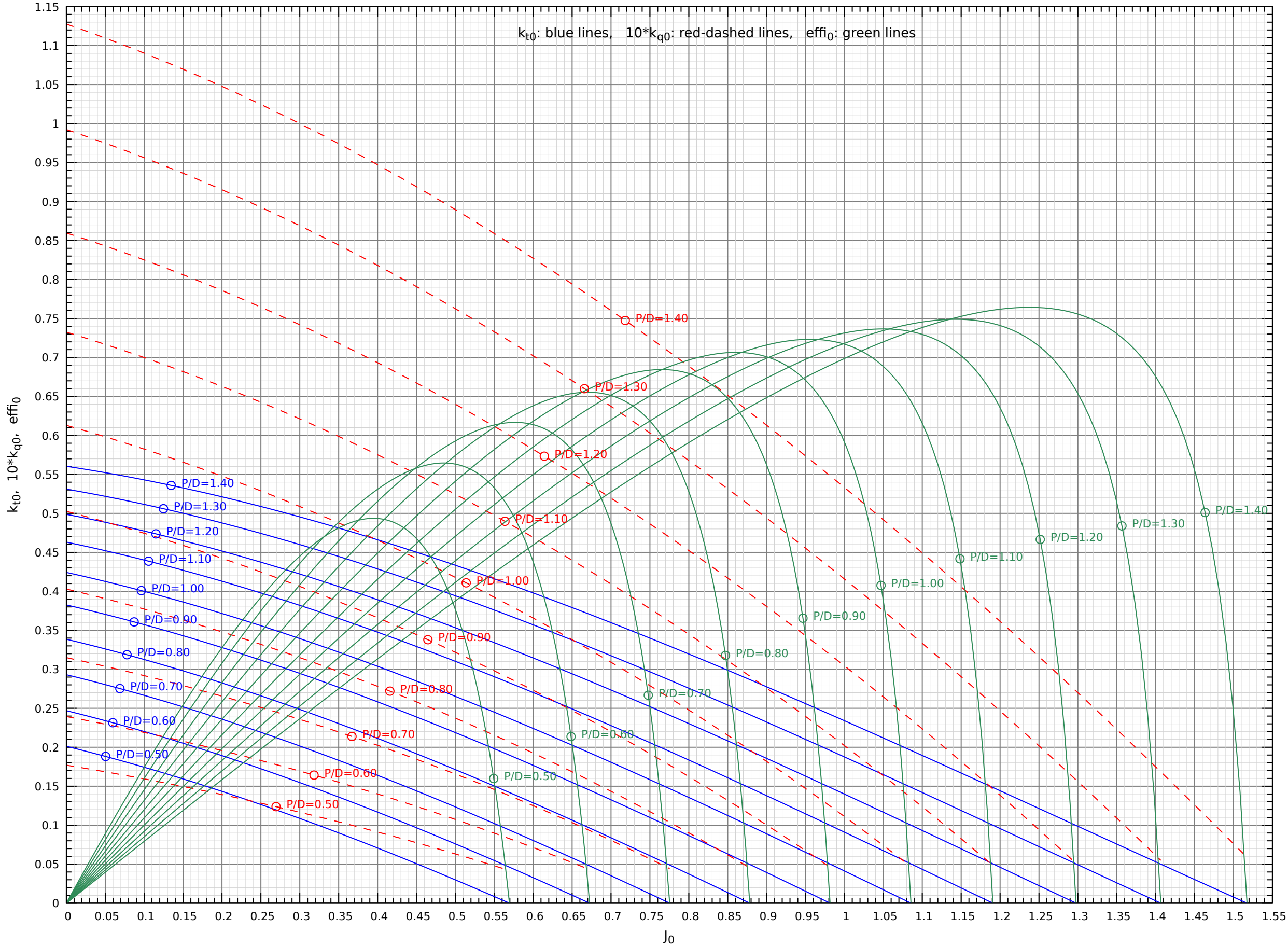
B4.050, Rey= 0.20E+09

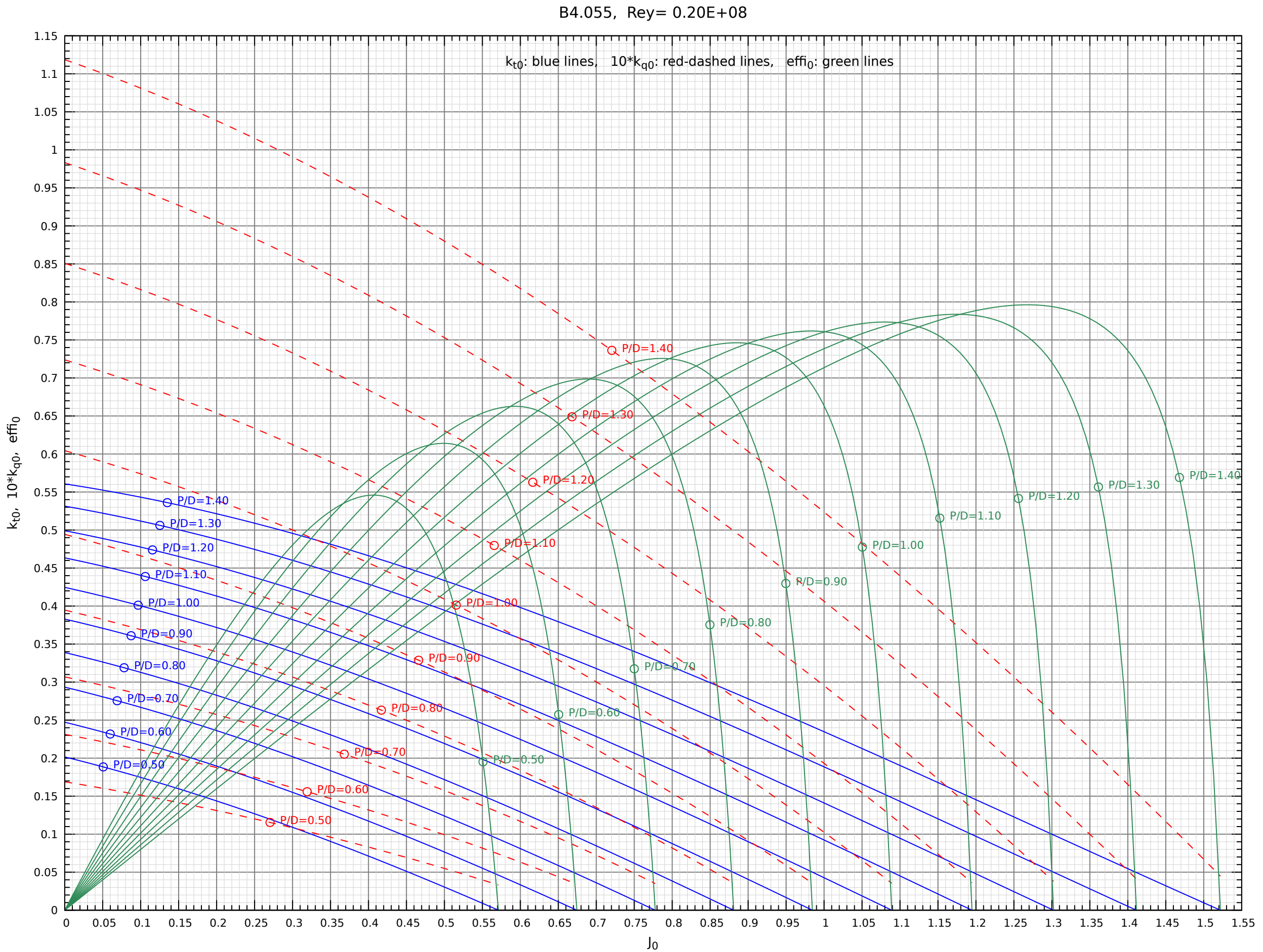


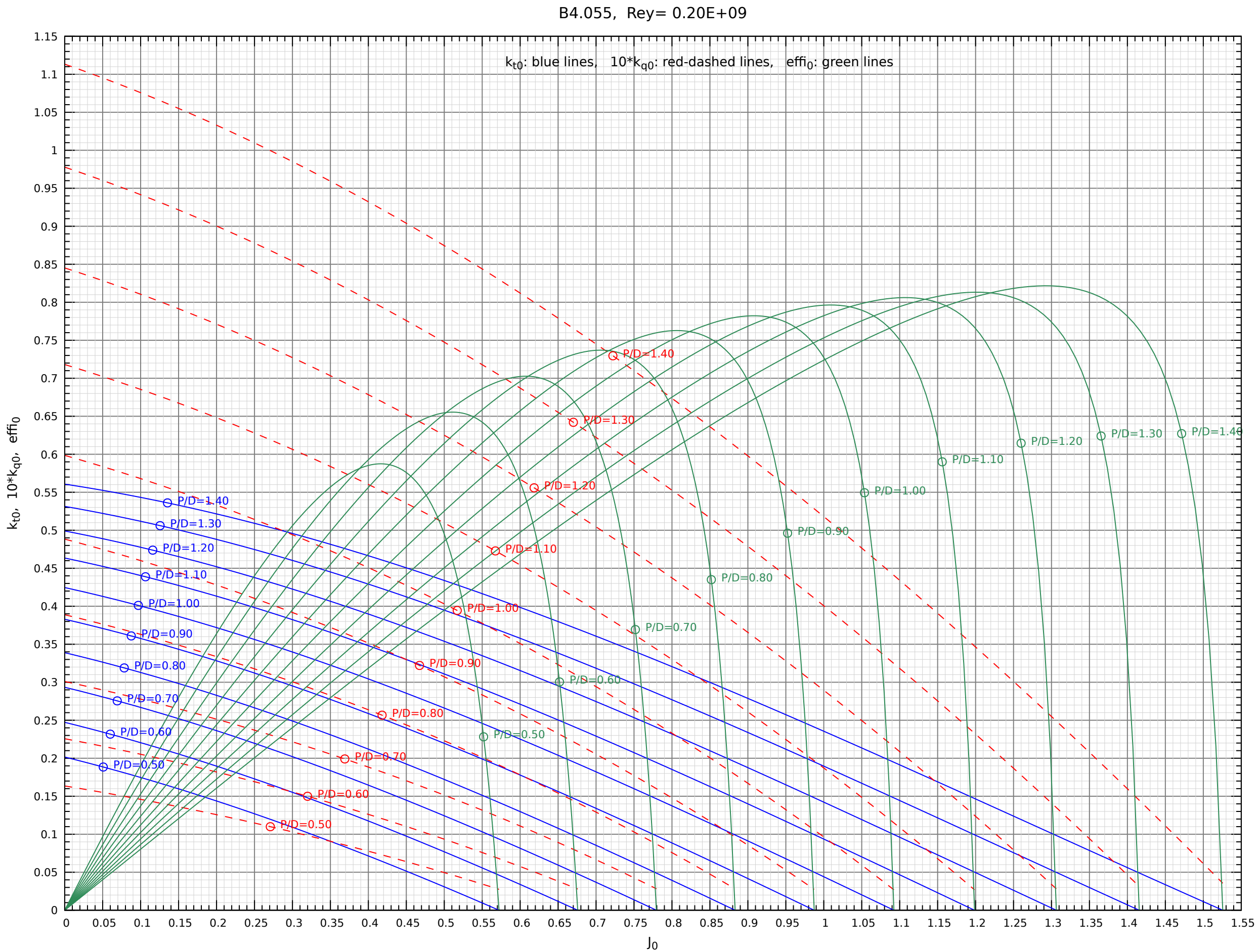
B4.050, Rey= 0.20E+10



B4.055, Rey= 0.20E+07




B4.055, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.055, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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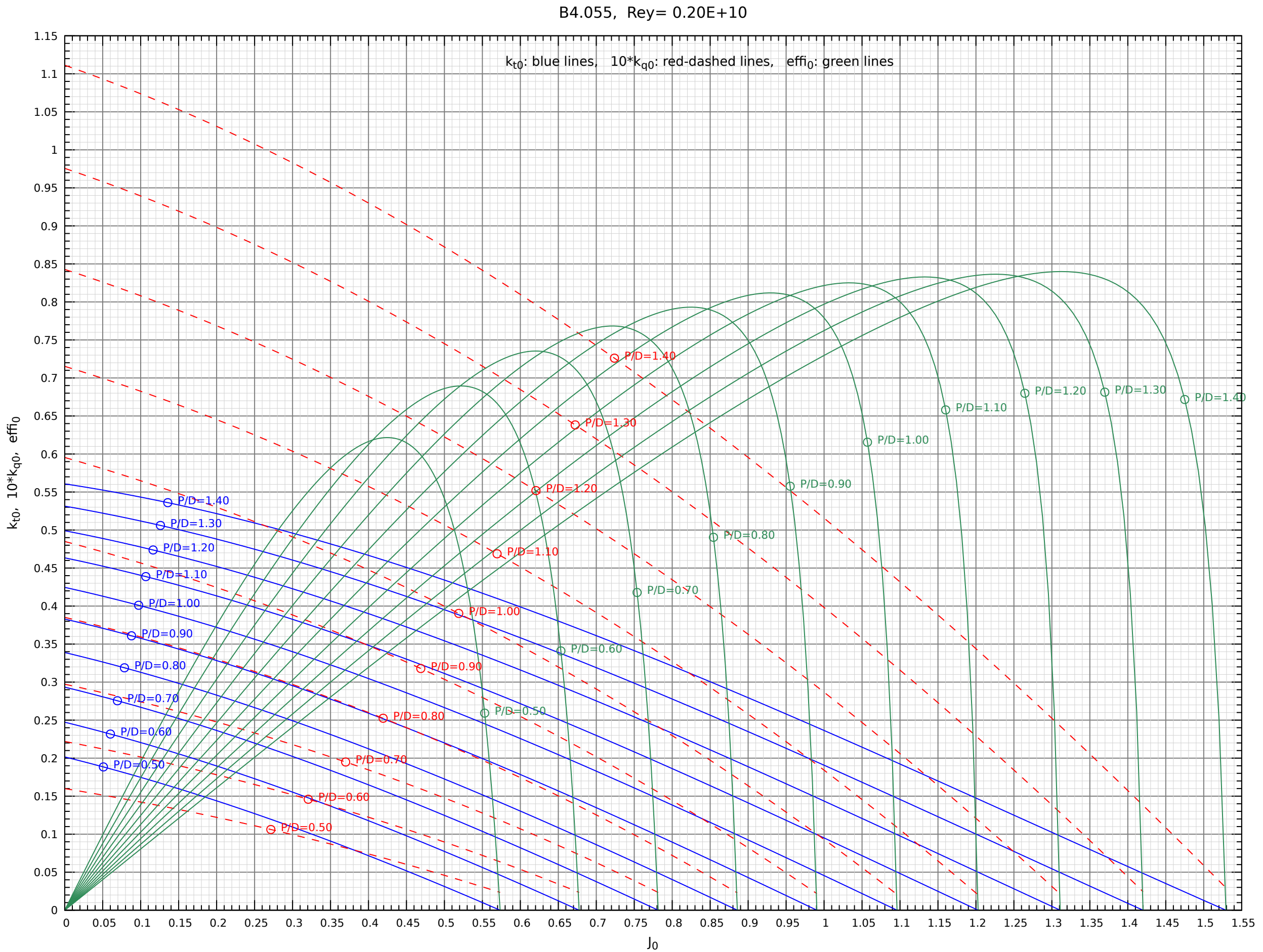
P/D=0.60
P/D=0.50


B4.055, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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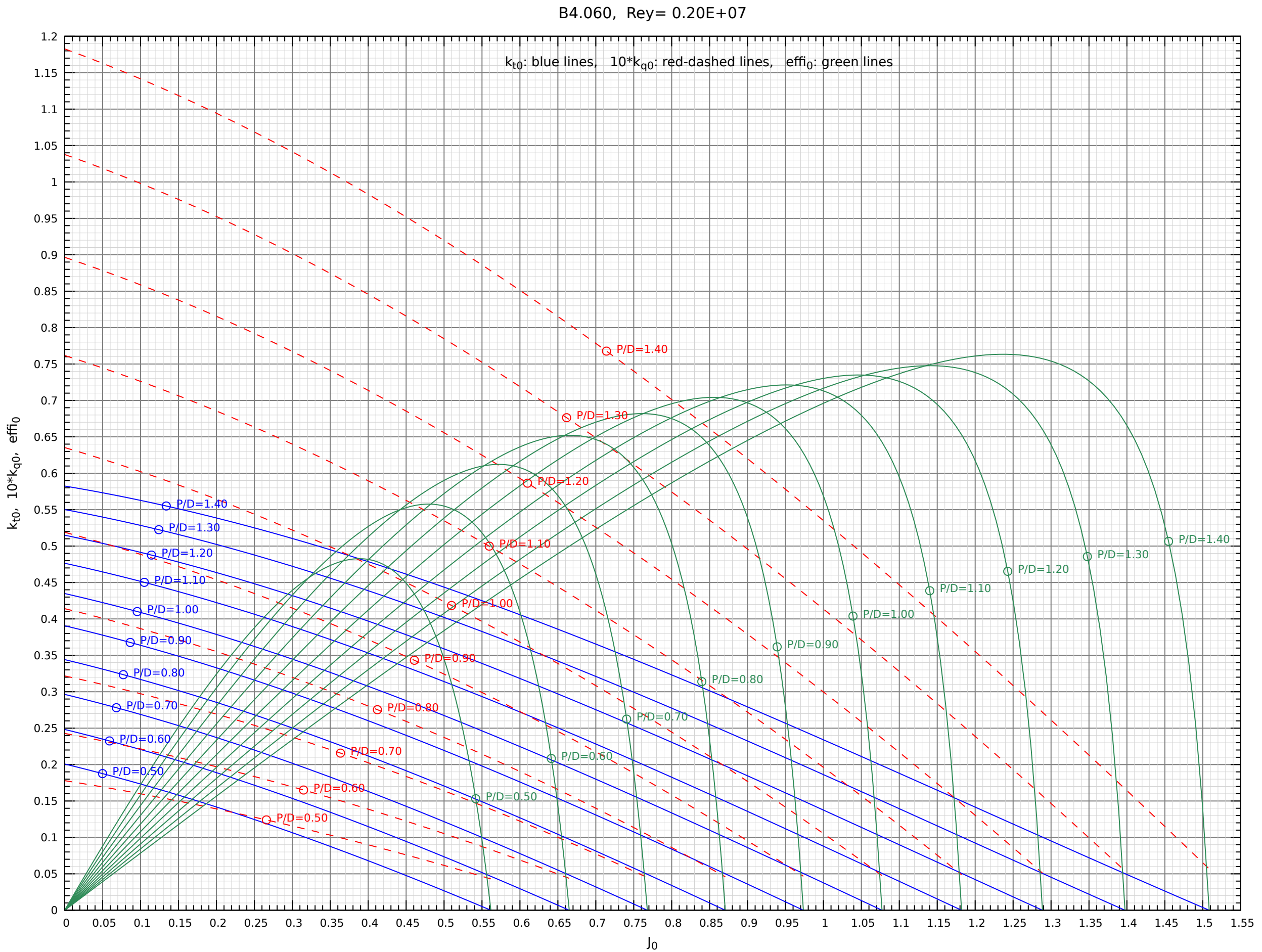
P/D=0.60
P/D=0.50


B4.060, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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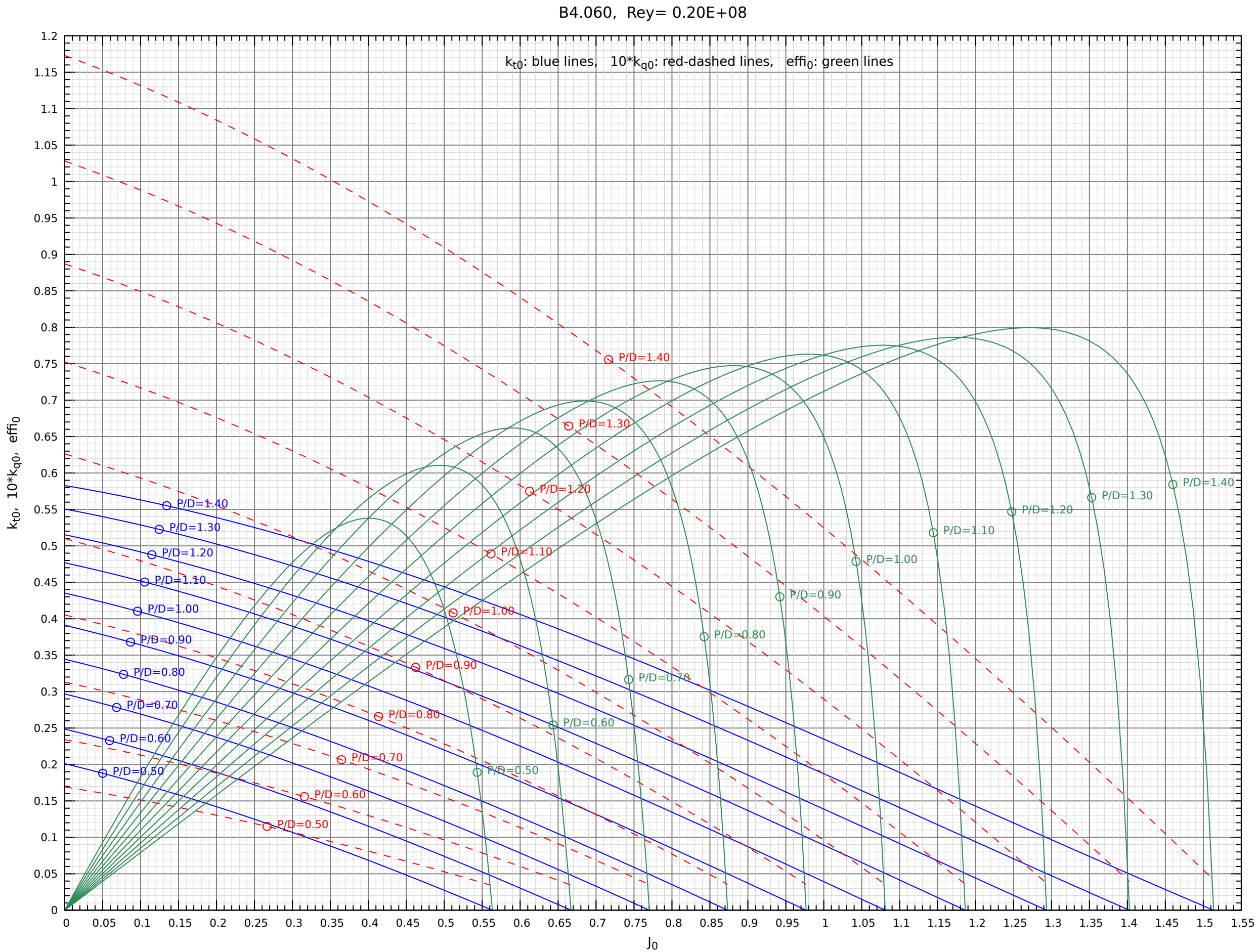
P/D=0.70
P/D=0.60
P/D=0.50


B4.060, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=1.00
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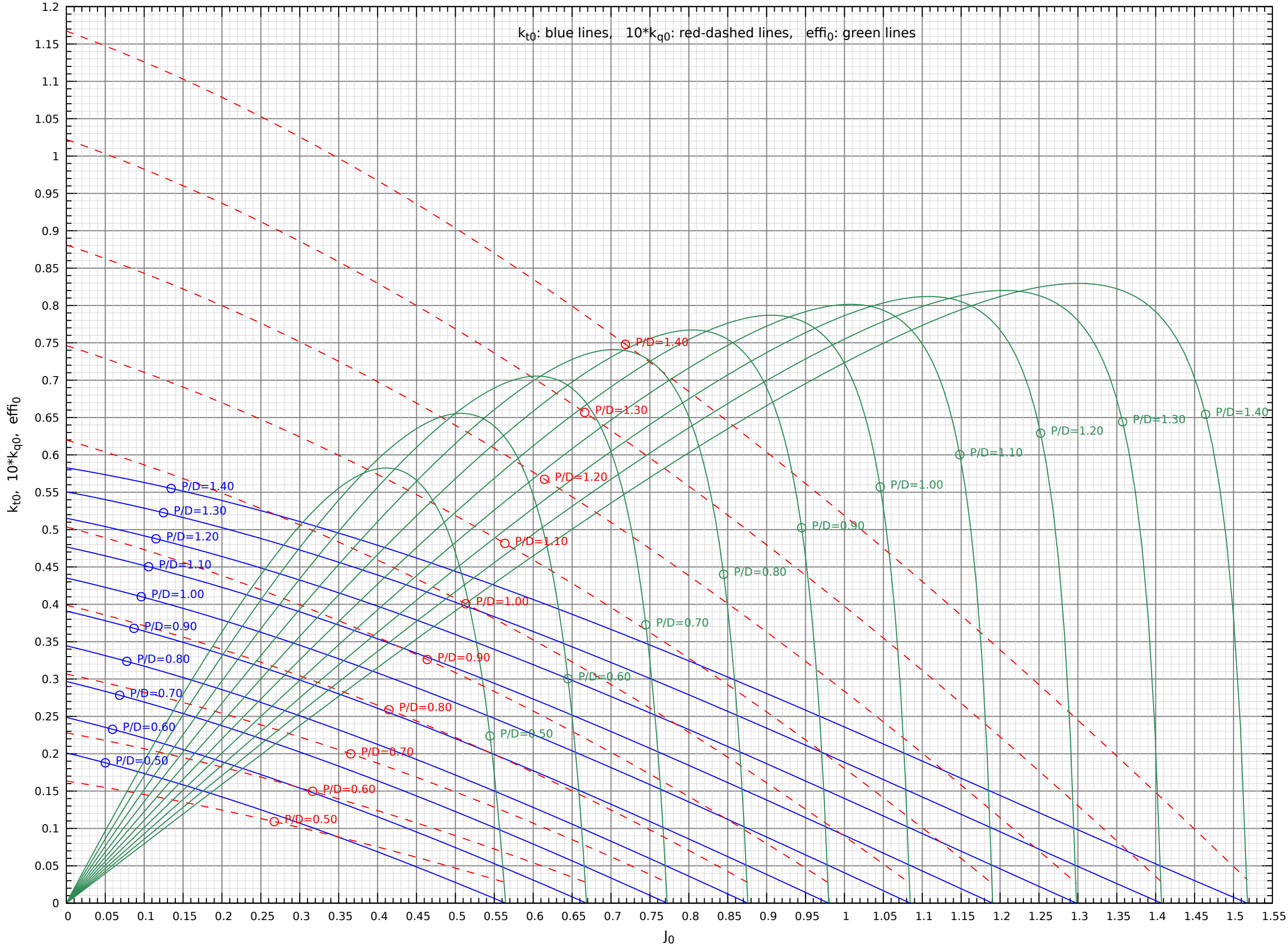
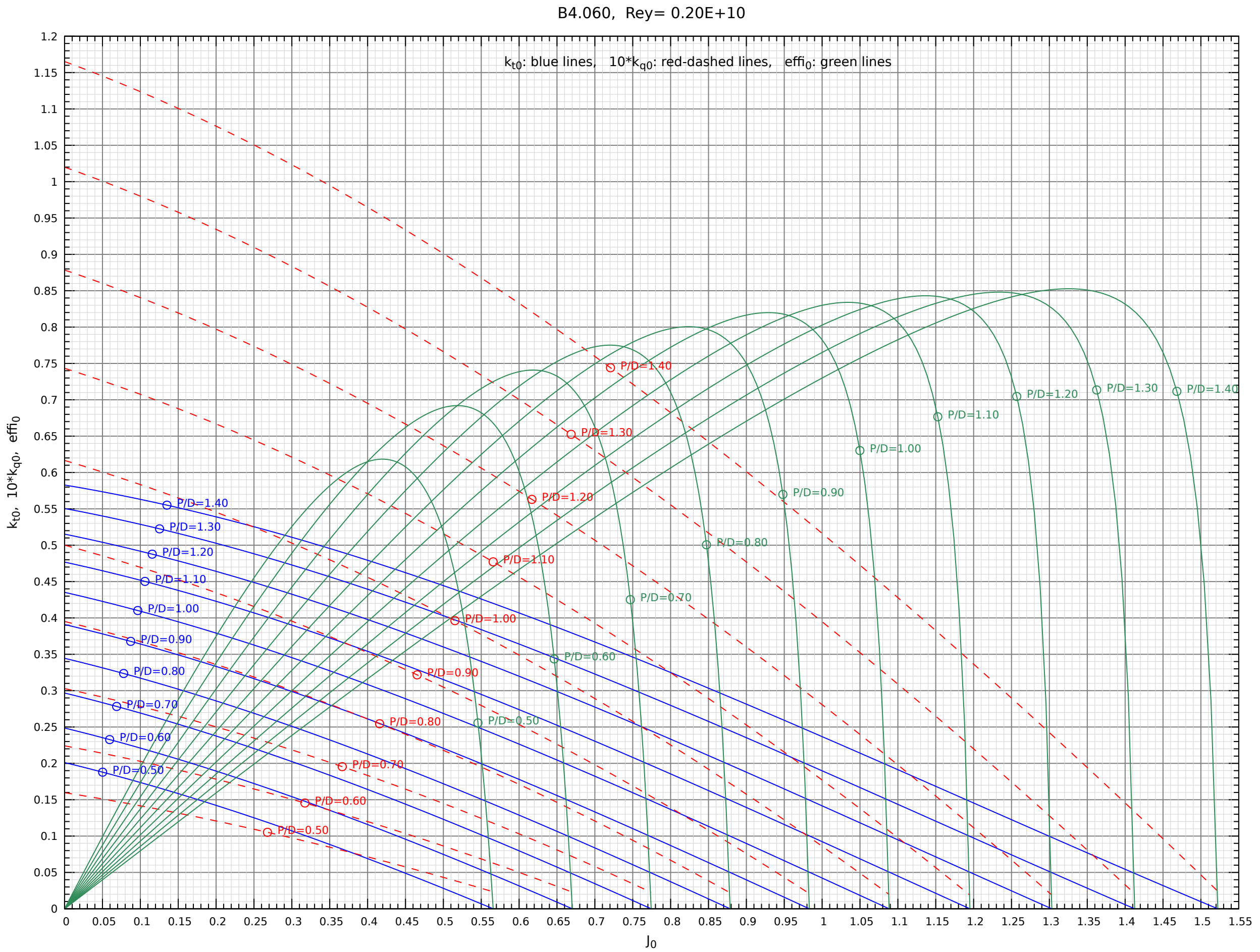
P/D=0.70
P/D=0.60
P/D=0.50

B4.060, Rey= 0.20E+09




B4.060, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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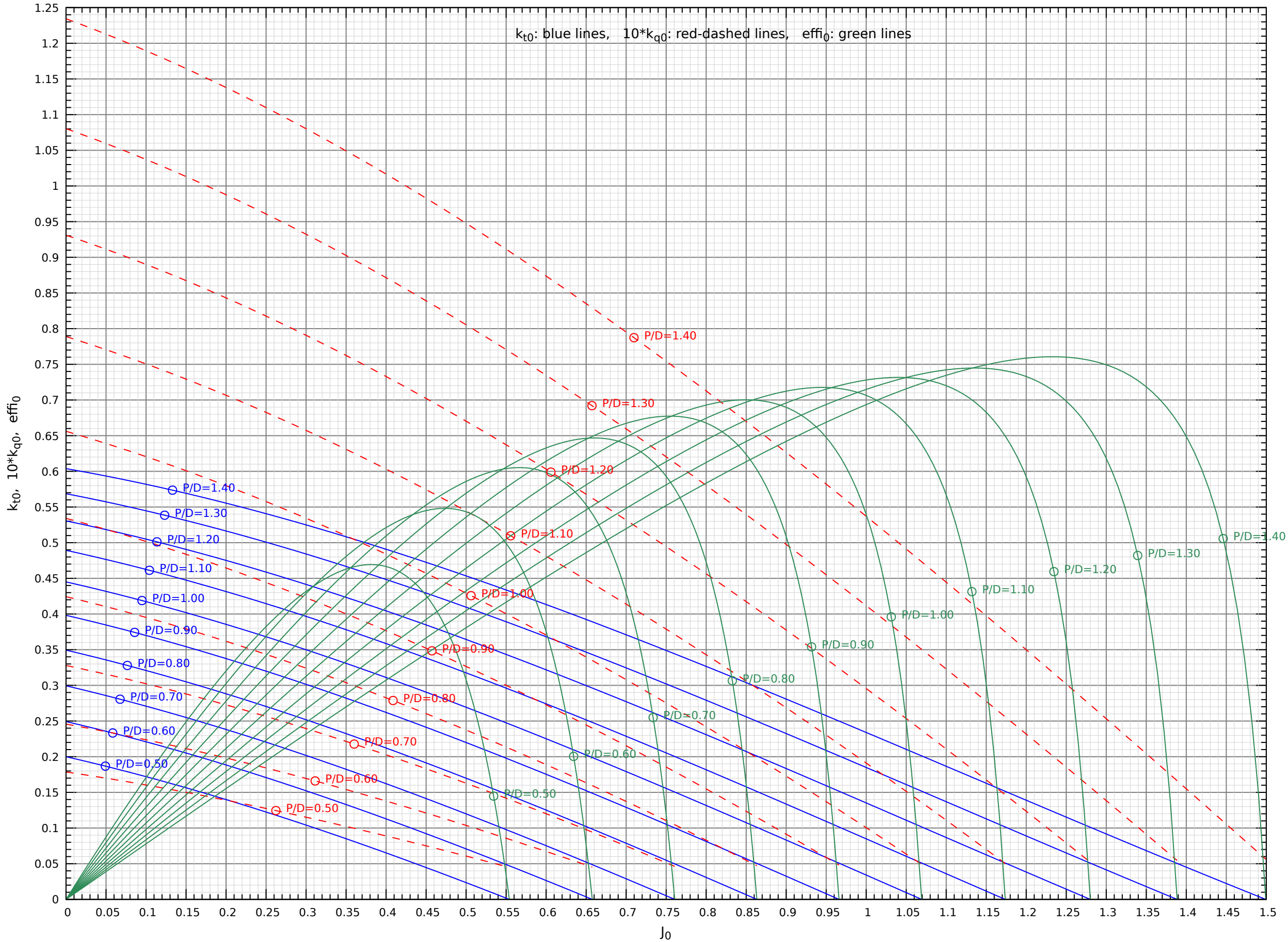
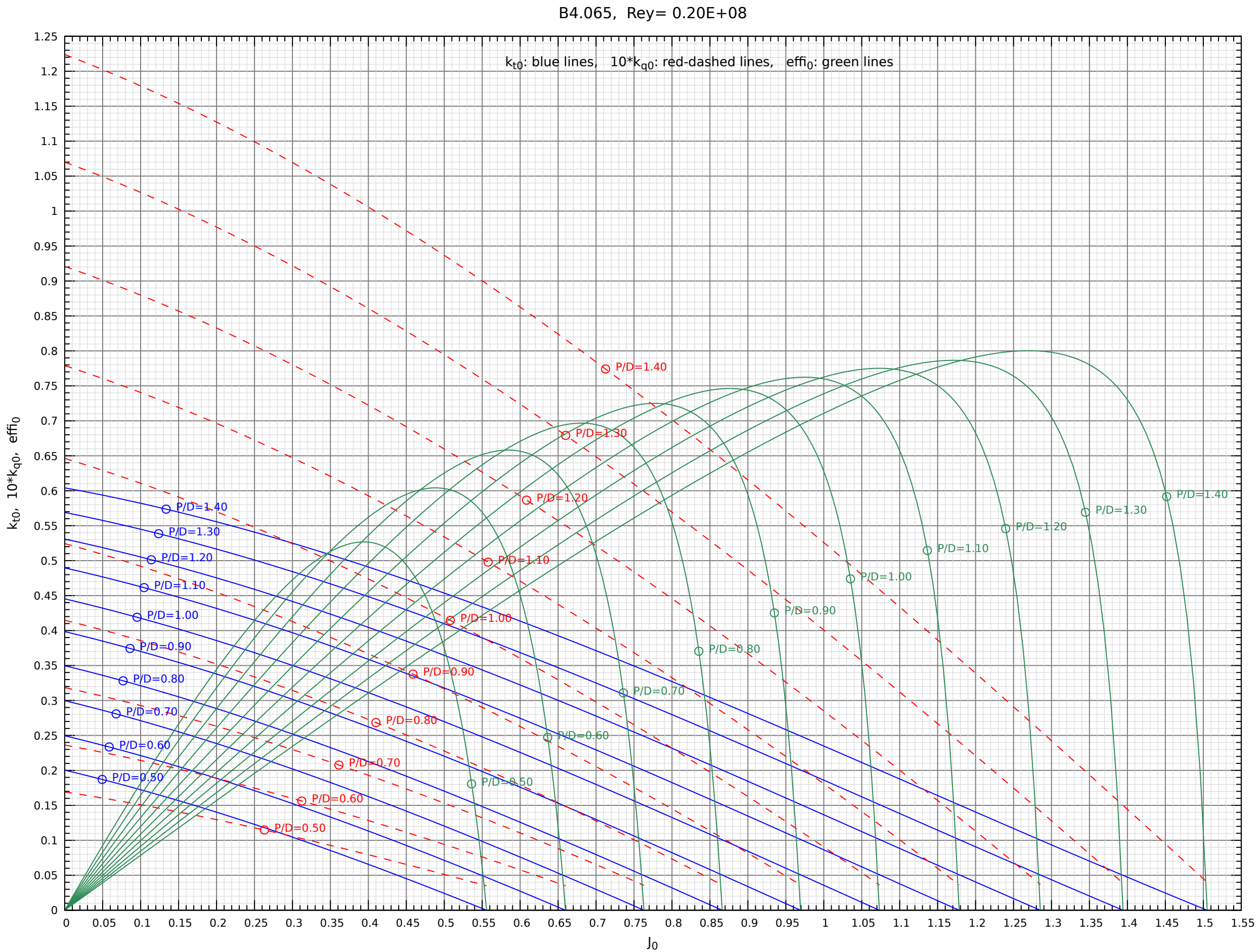
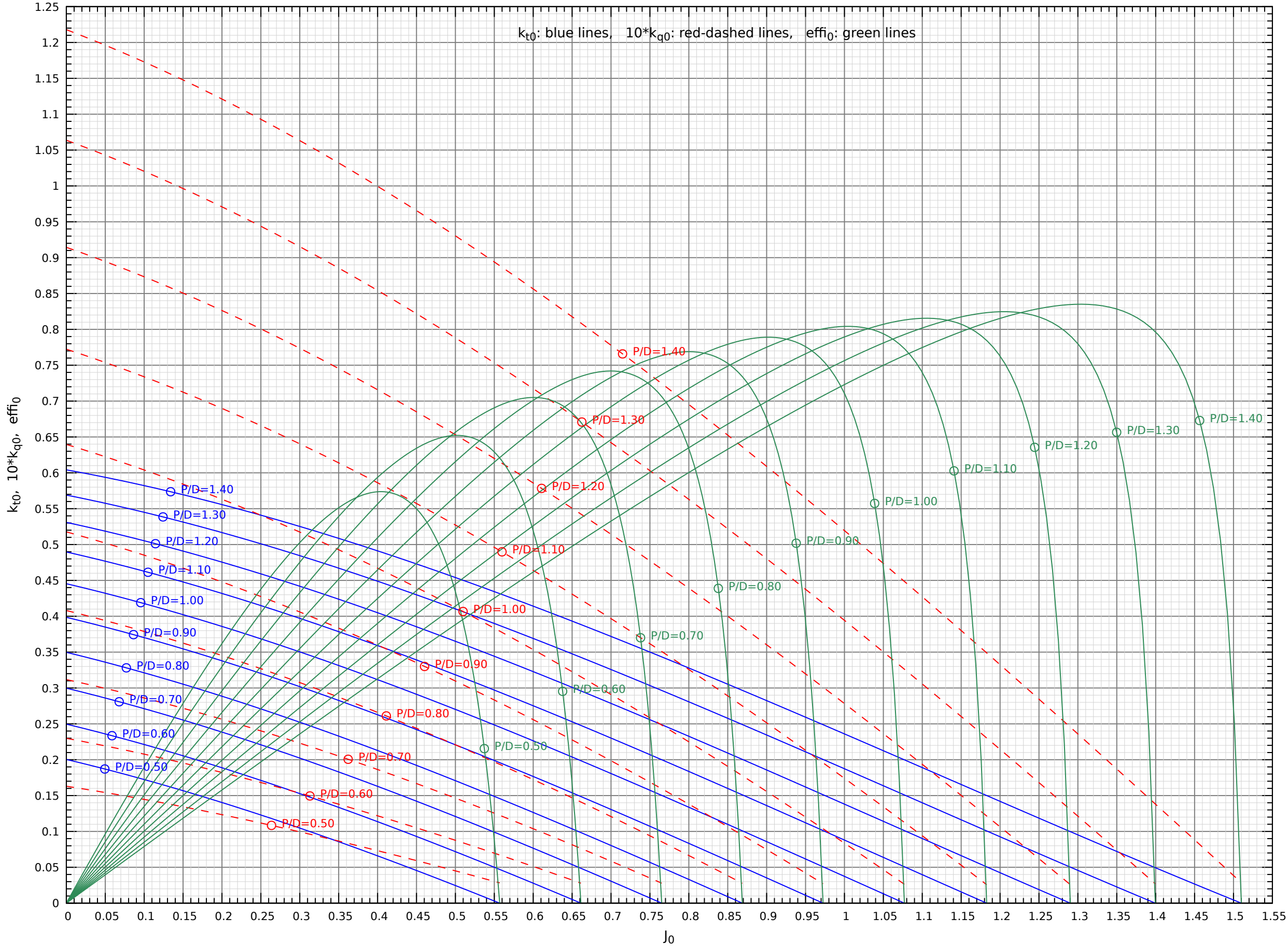
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

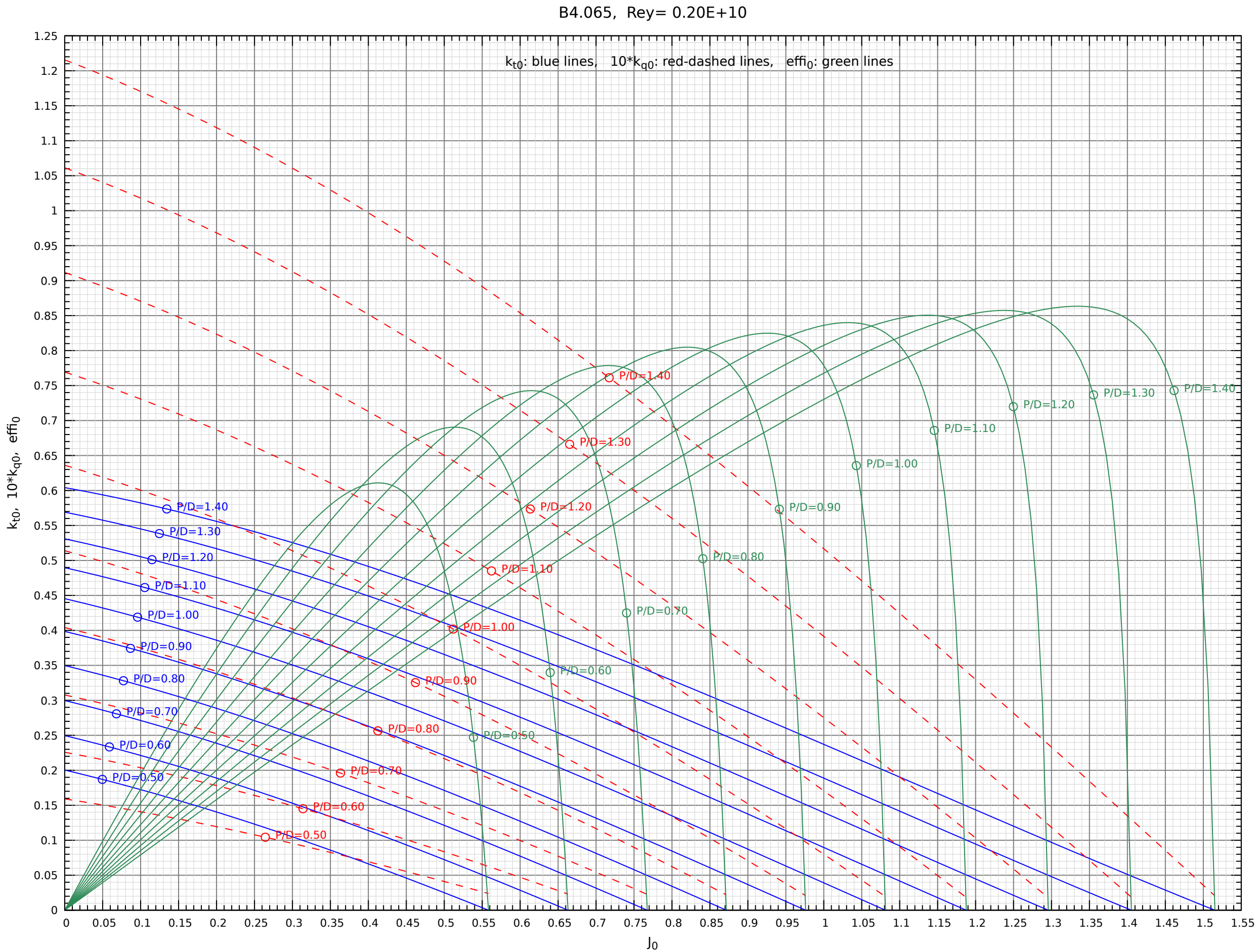
B4.065, Rey= 0.20E+07

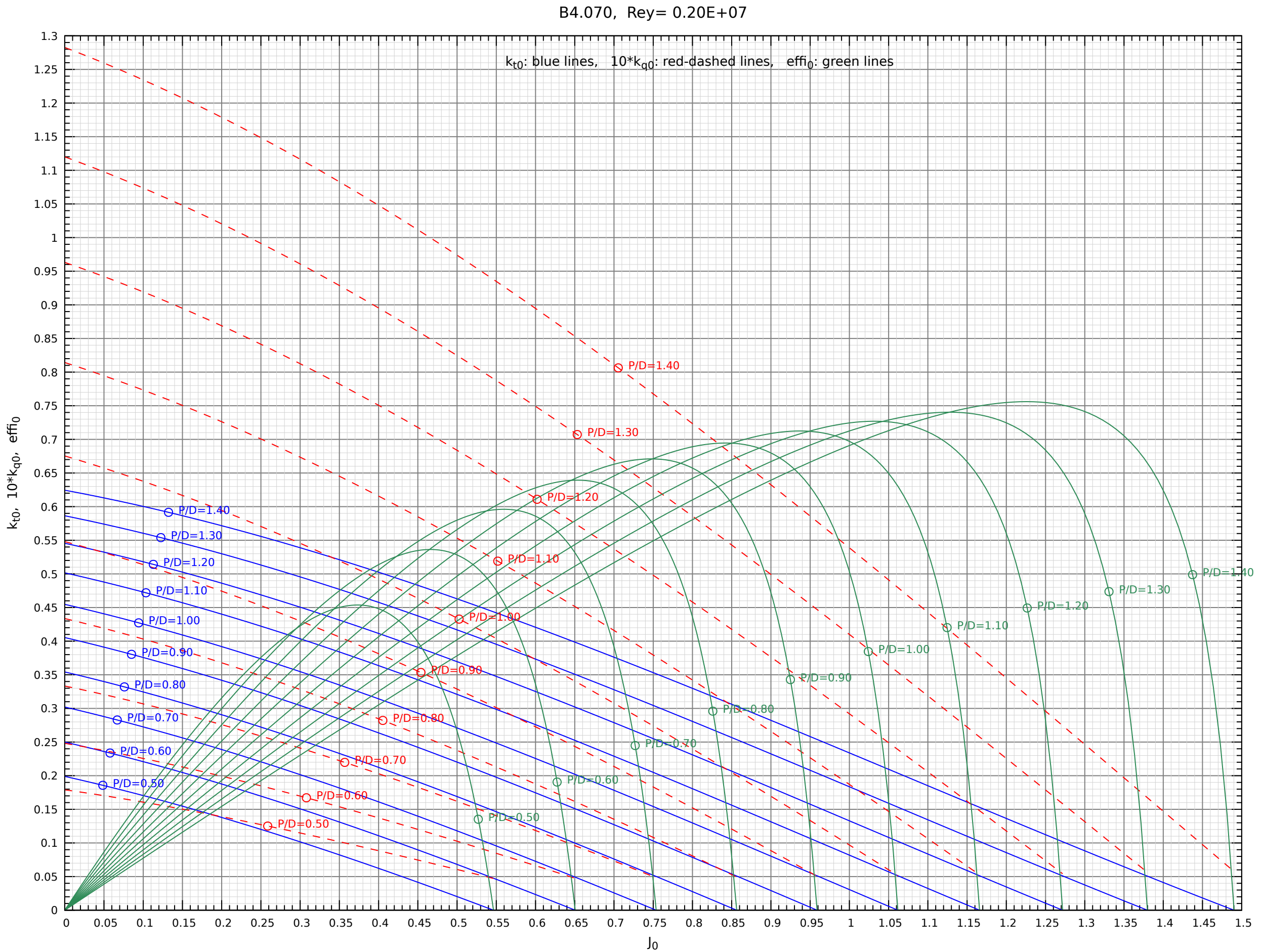


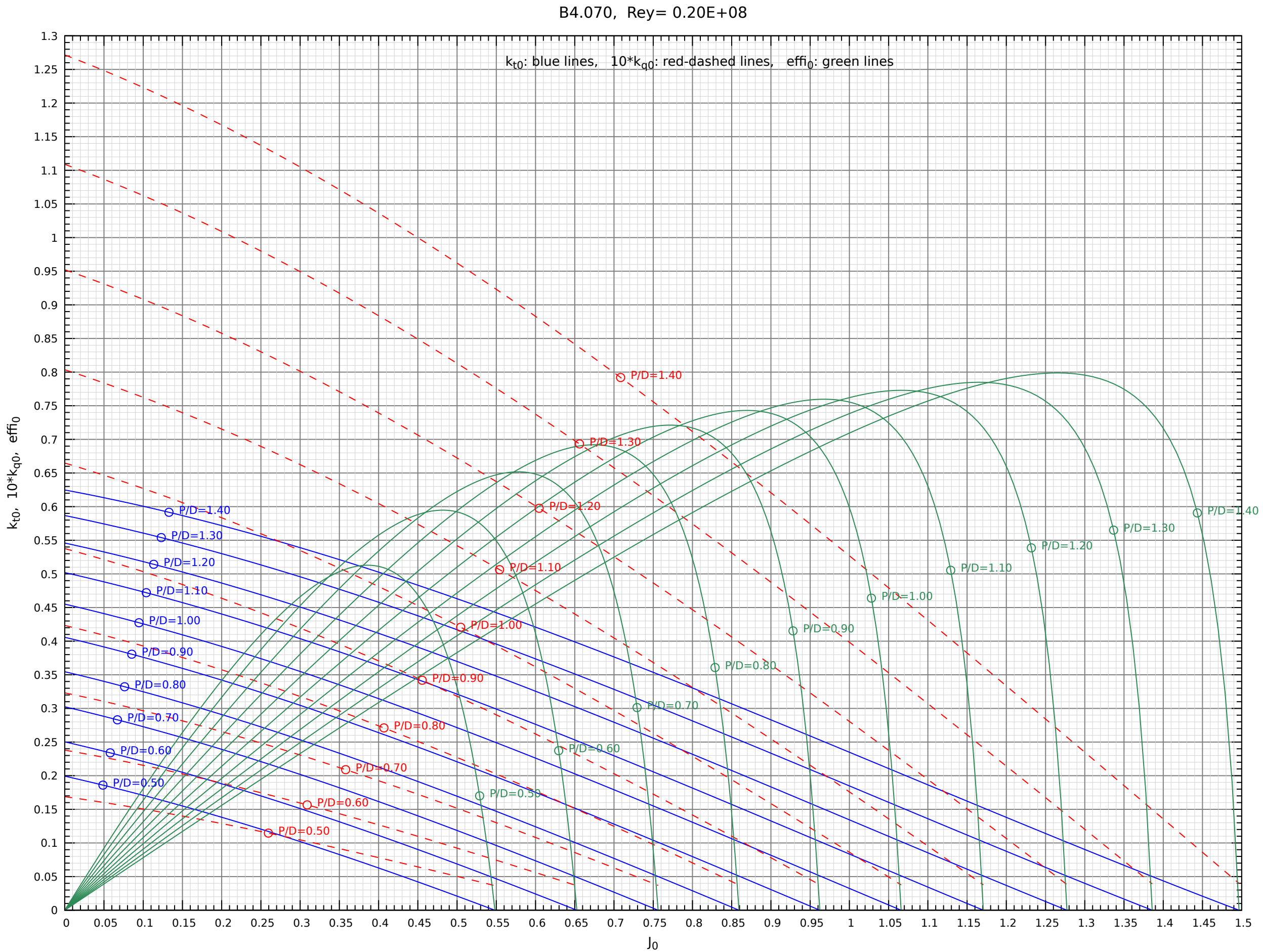

B4.065, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.065, Rey= 0.20E+09

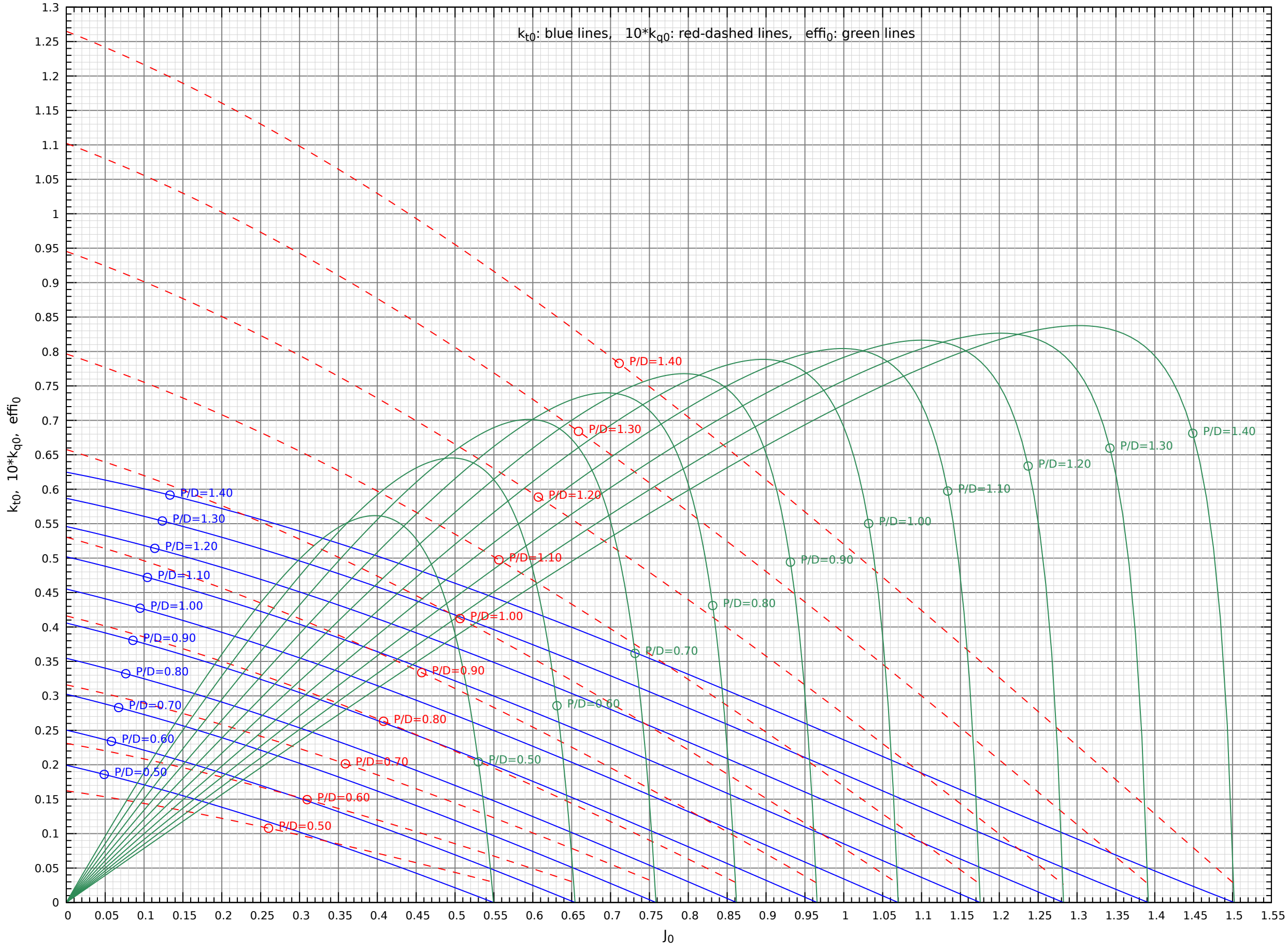



B4.065, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

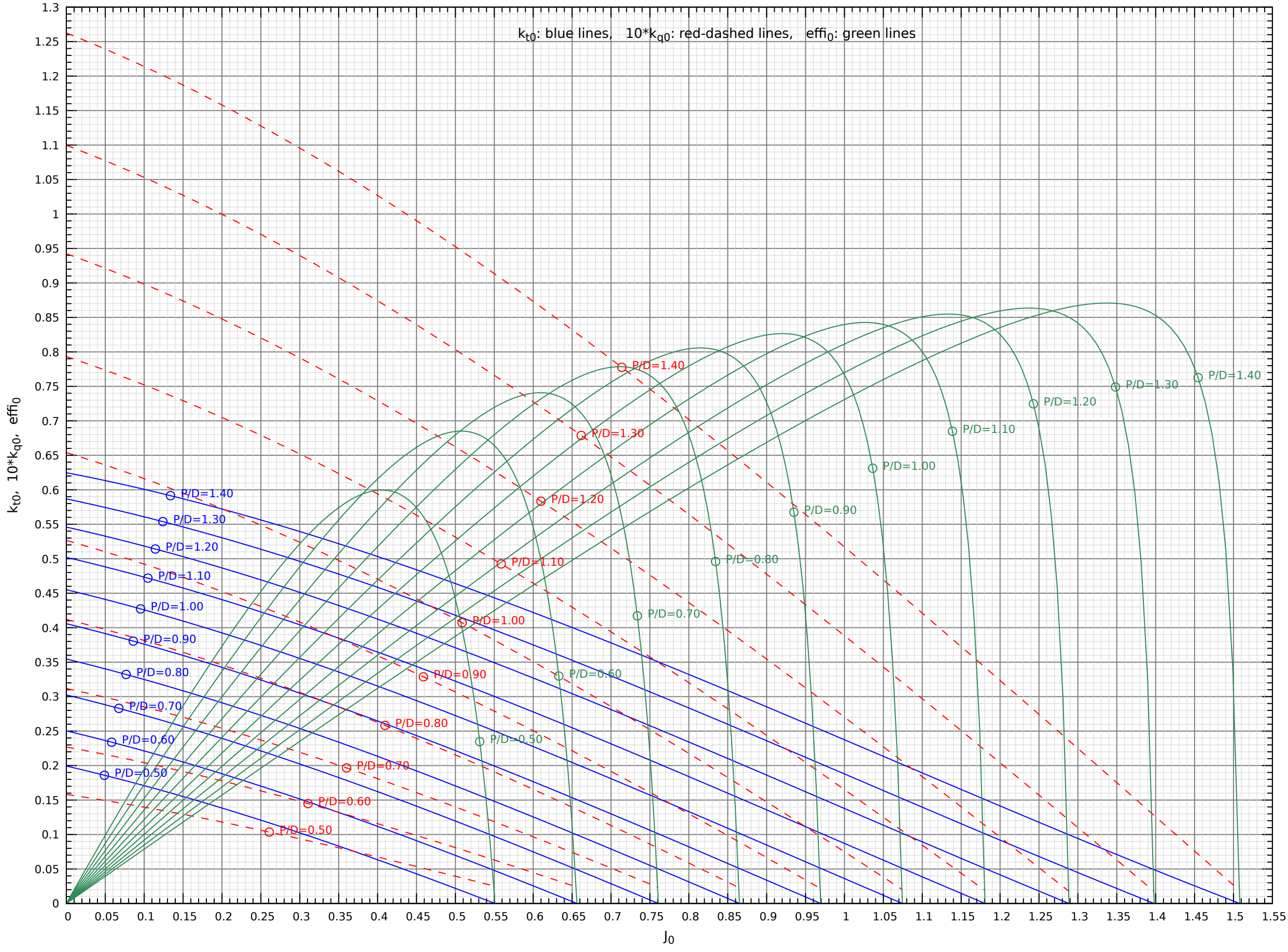

B4.070, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

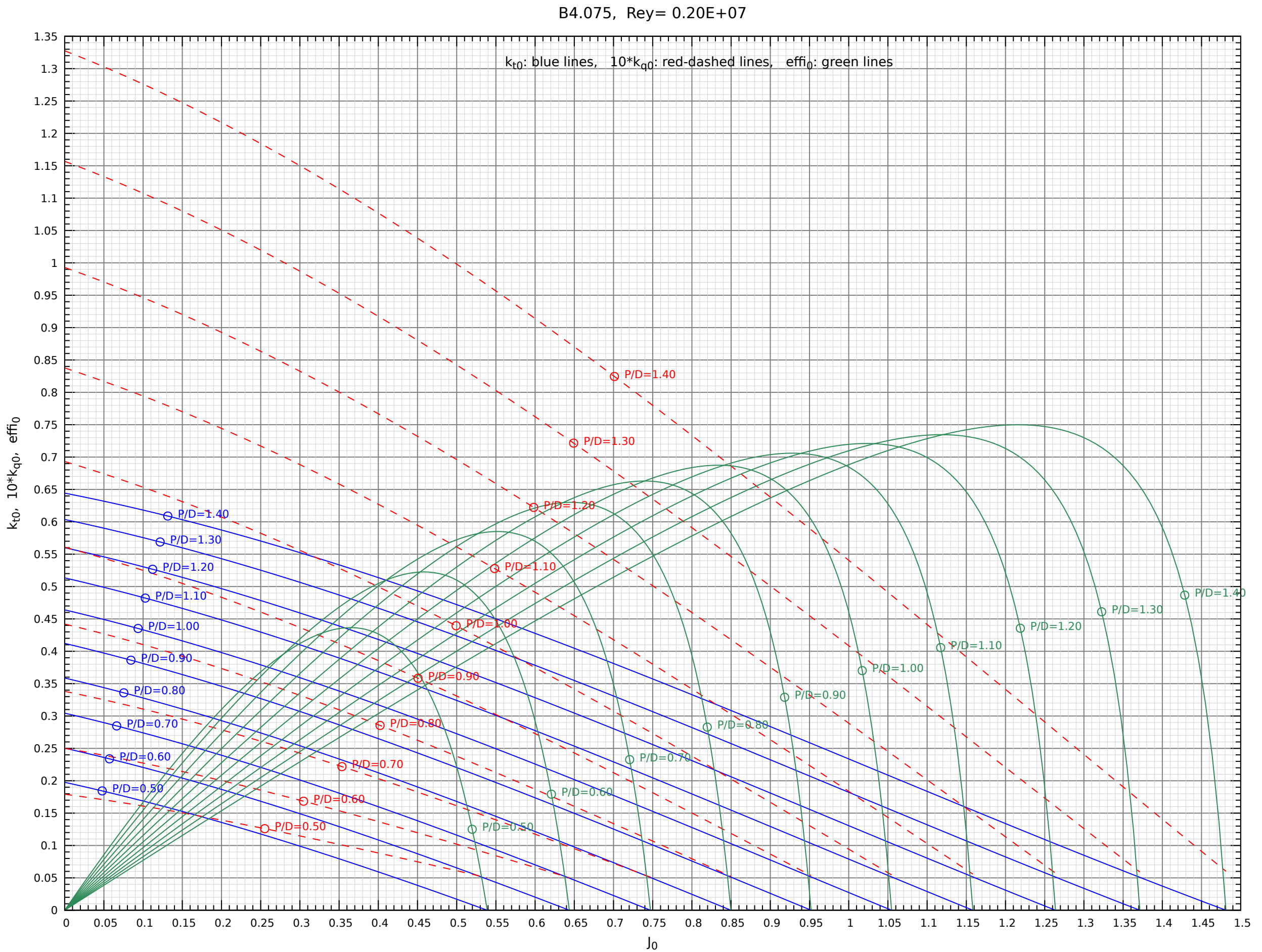

B4.070, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

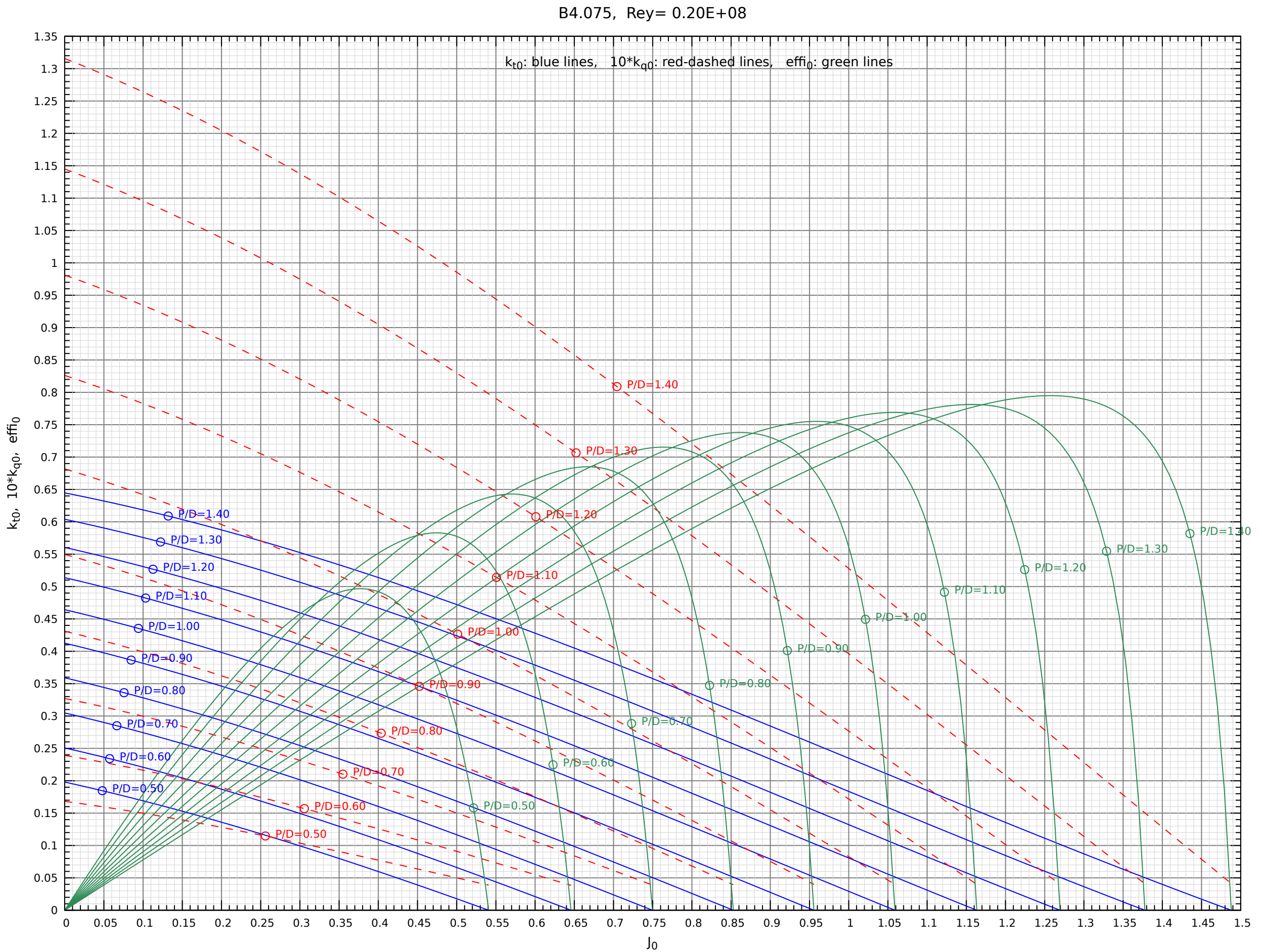
B4.070, Rey= 0.20E+09

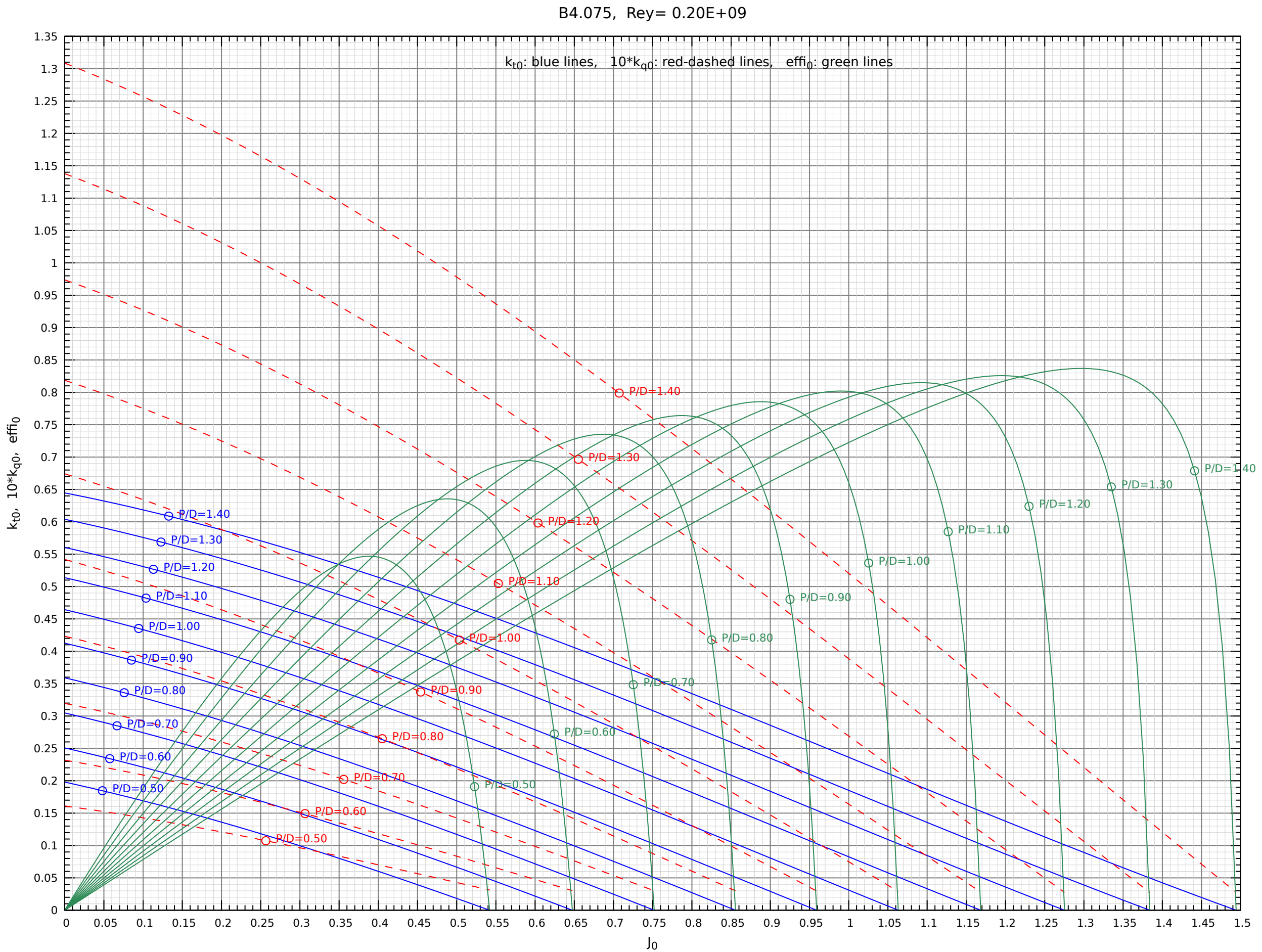


B4.070, Rey= 0.20E+10

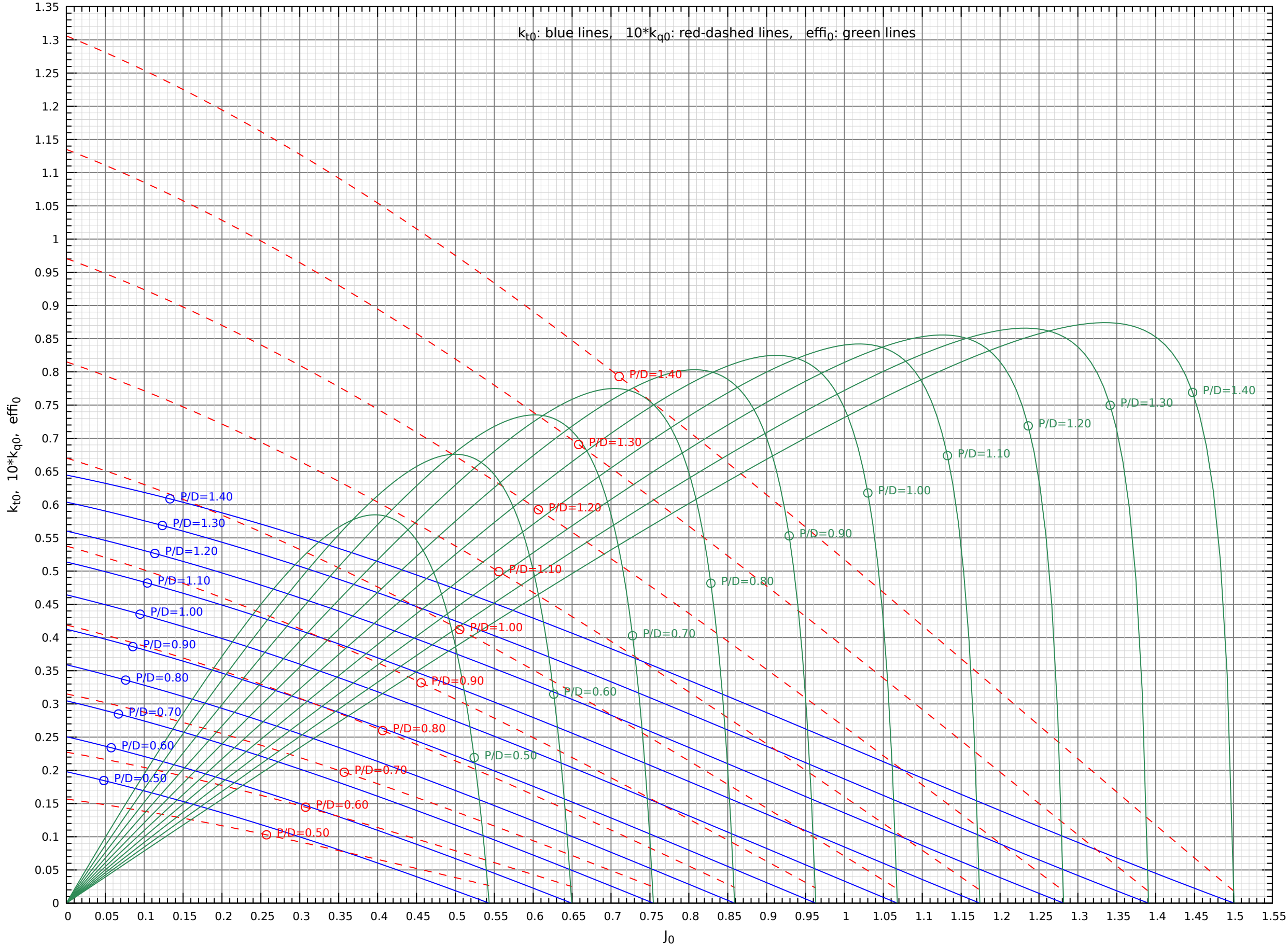



B4.075, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

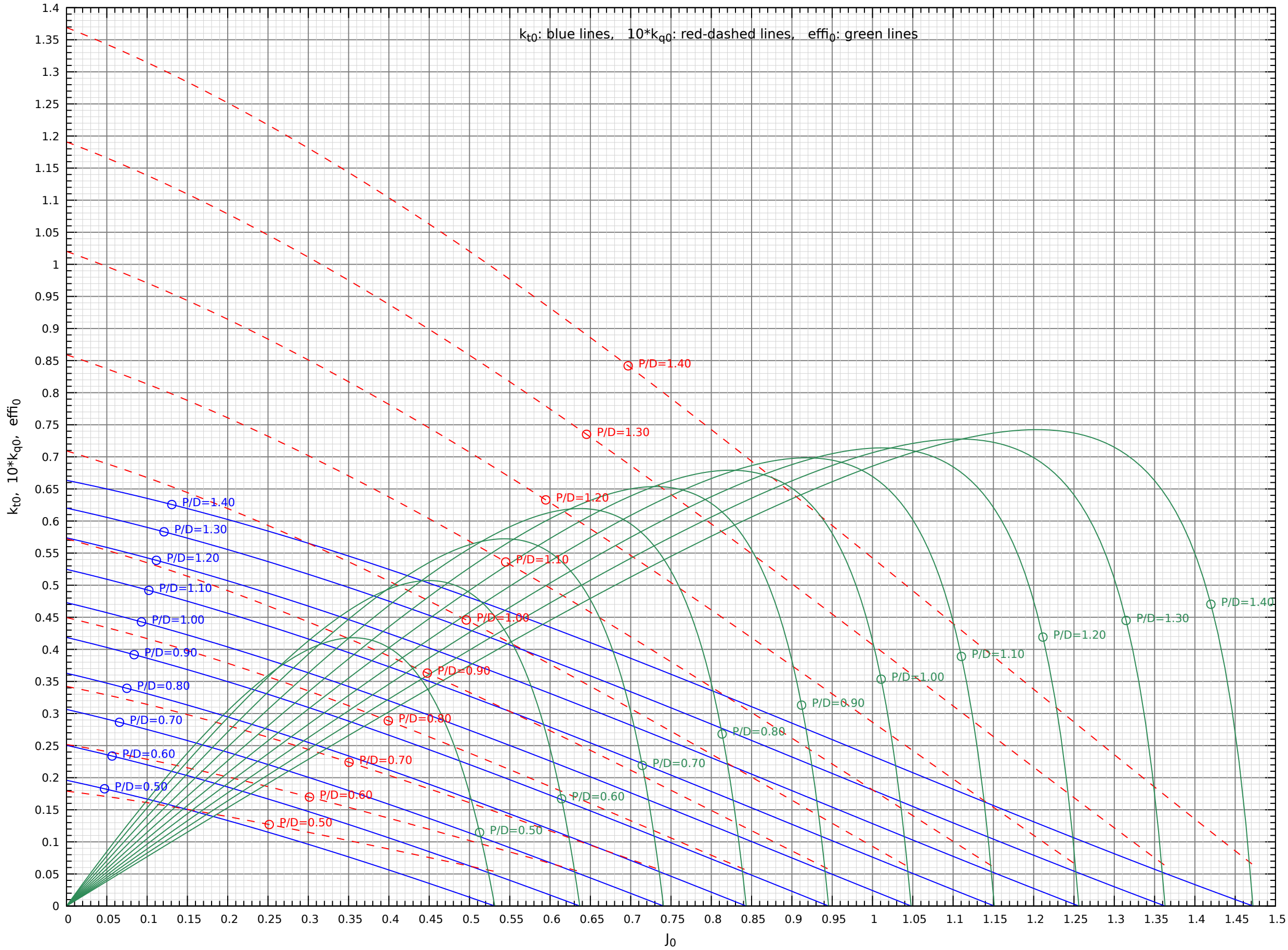

B4.075, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

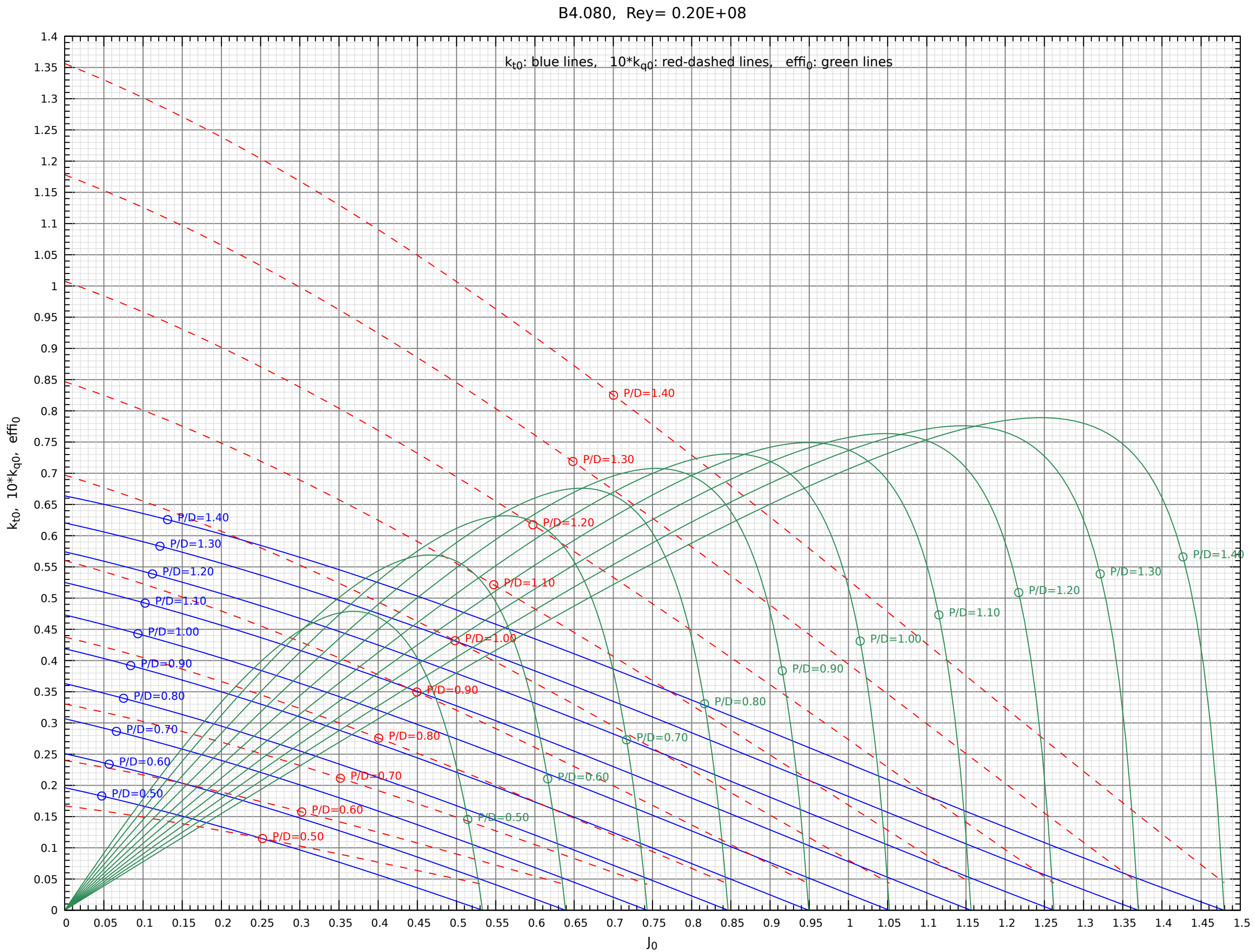

B4.075, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.075, Rey= 0.20E+10

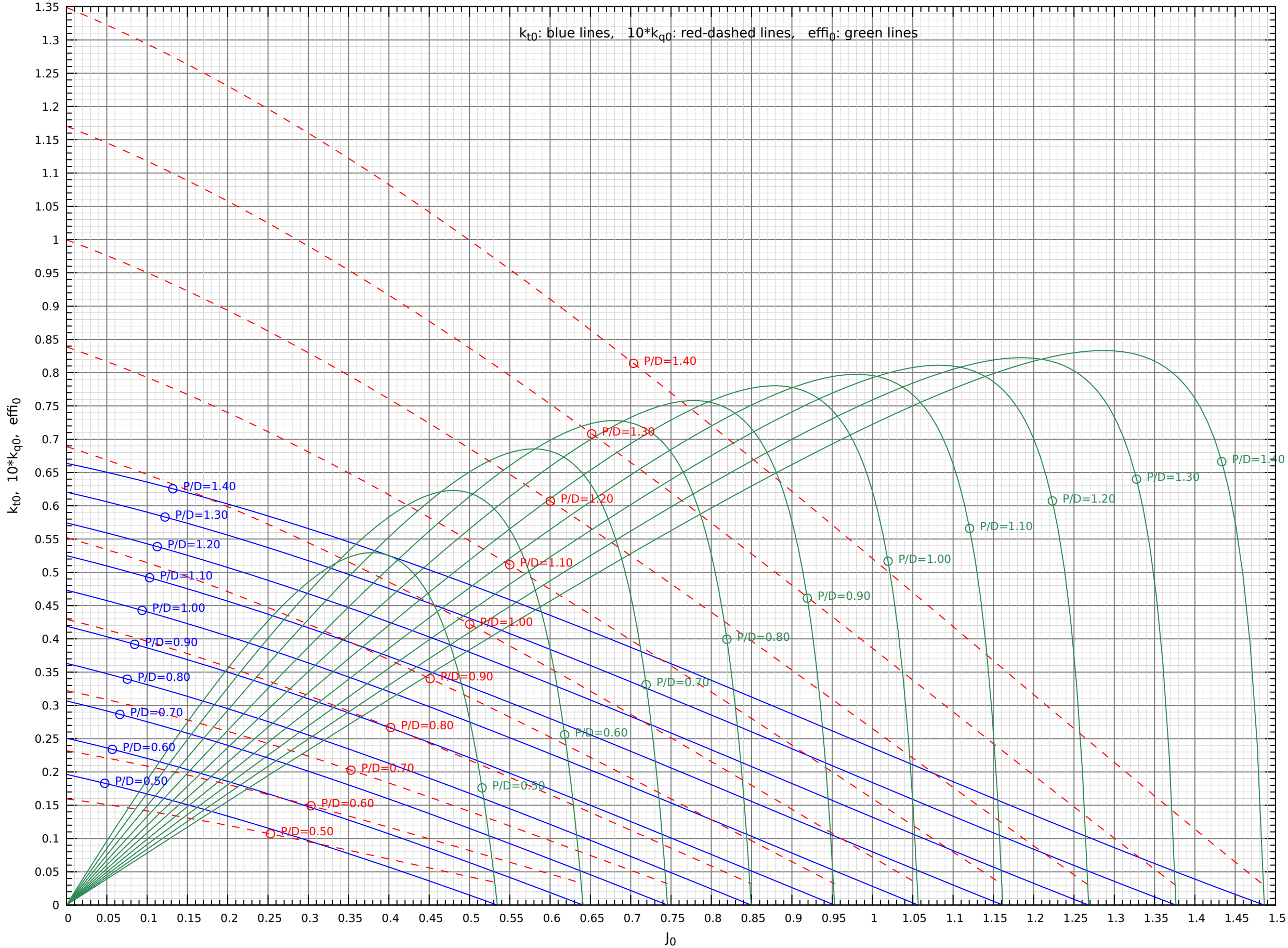


B4.080, Rey= 0.20E+07

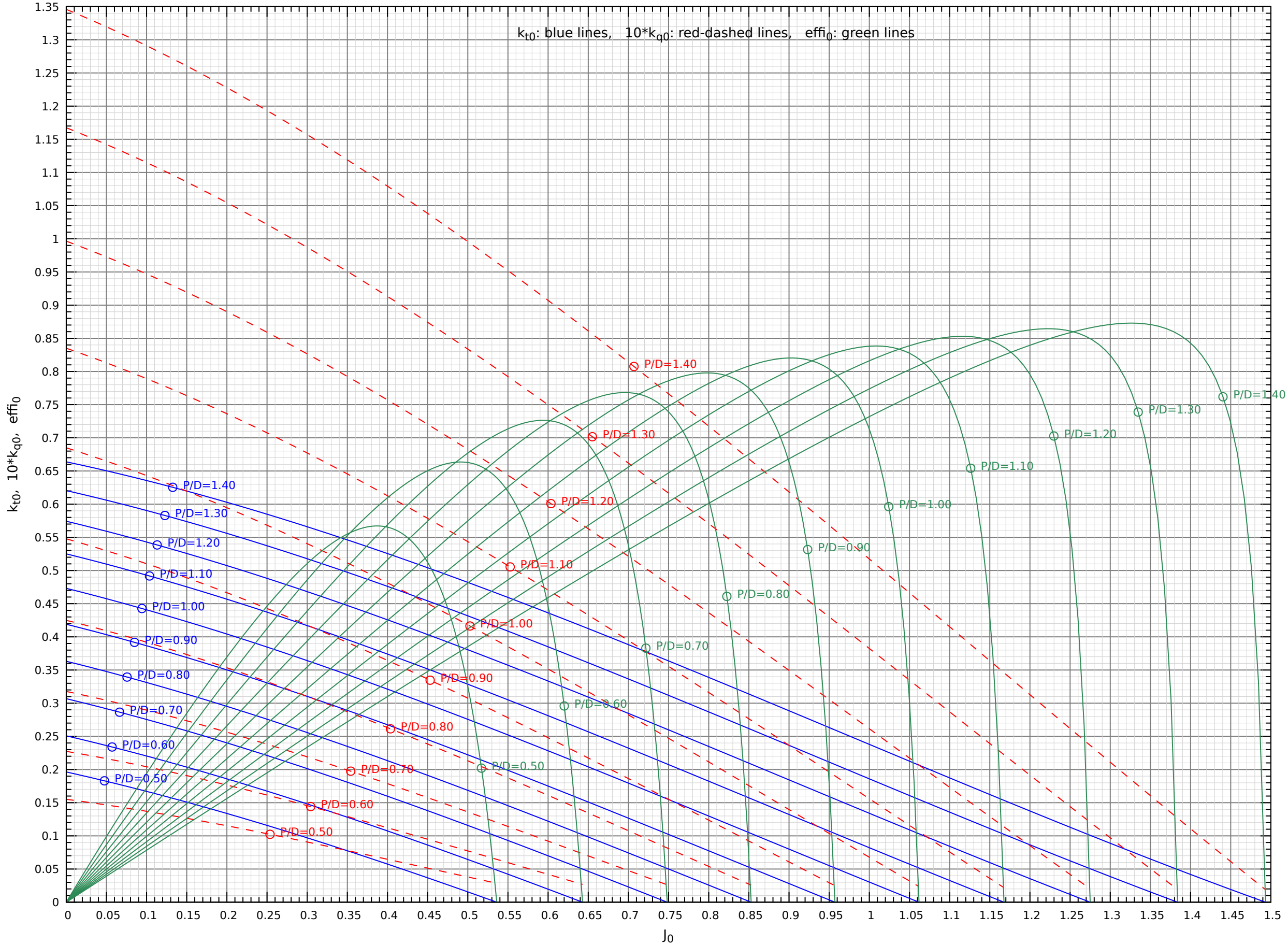


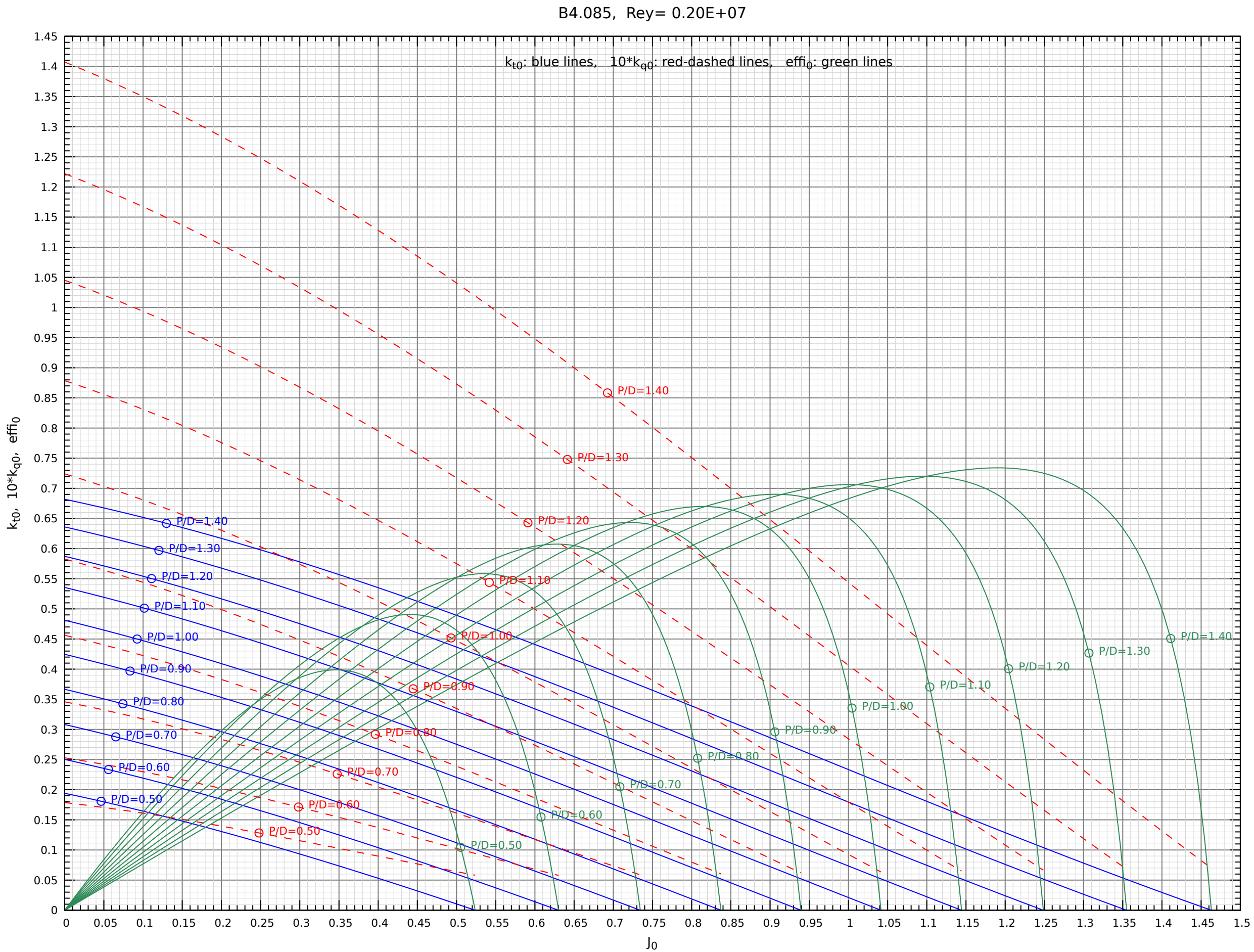

B4.080, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.080, Rey= 0.20E+09



B4.080, Rey= 0.20E+10




B4.085, Rey= 0.20E+07
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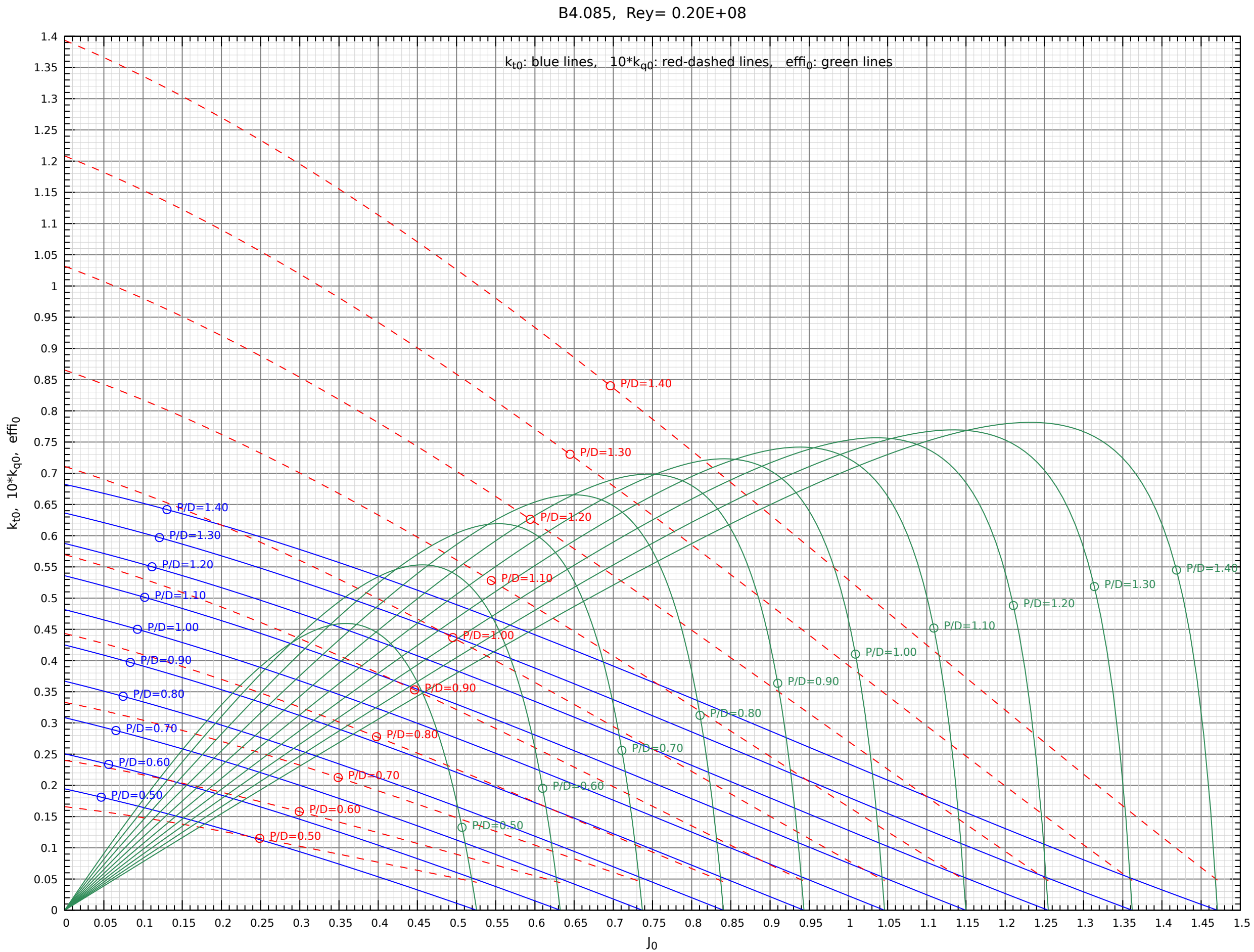
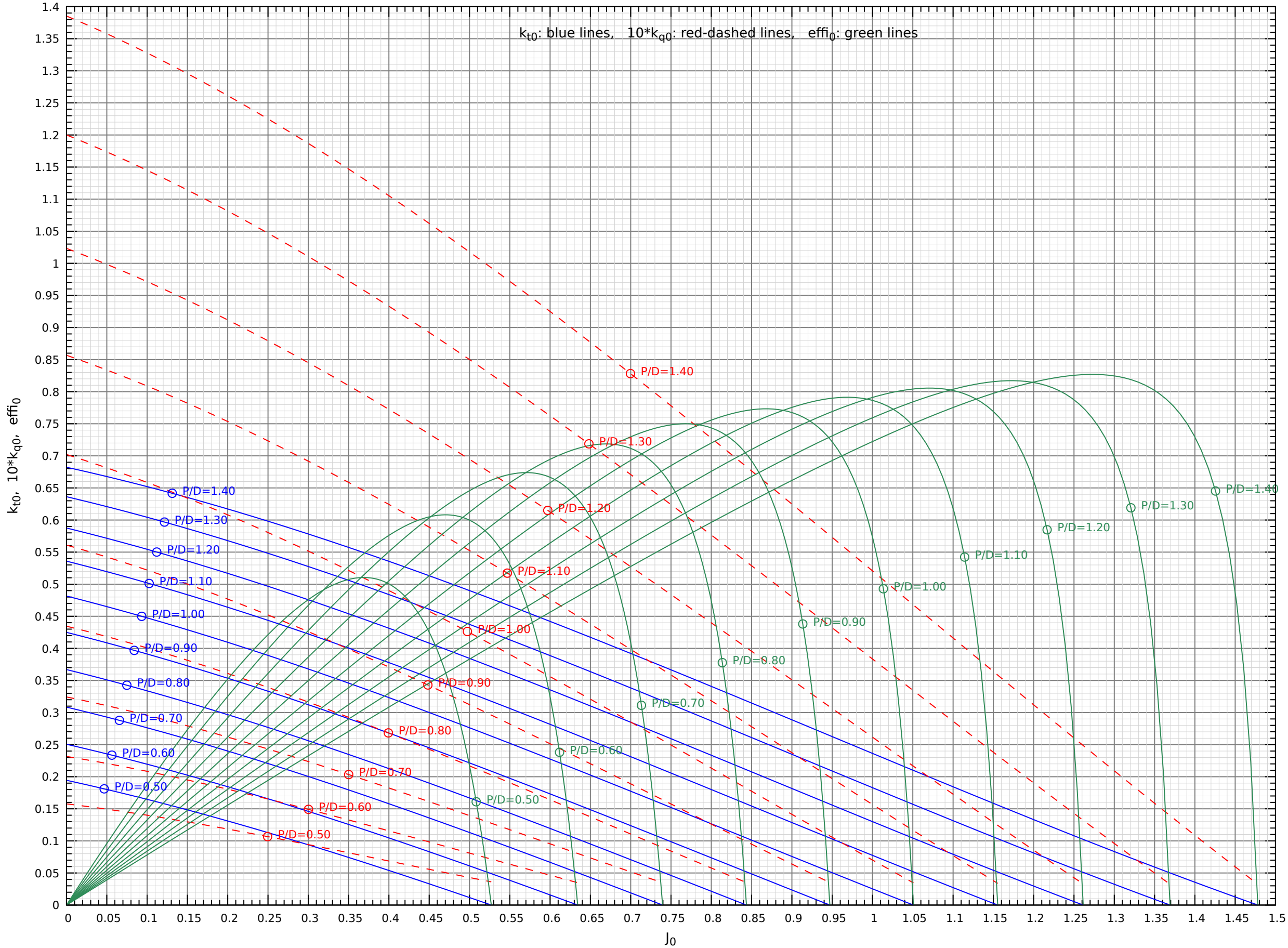
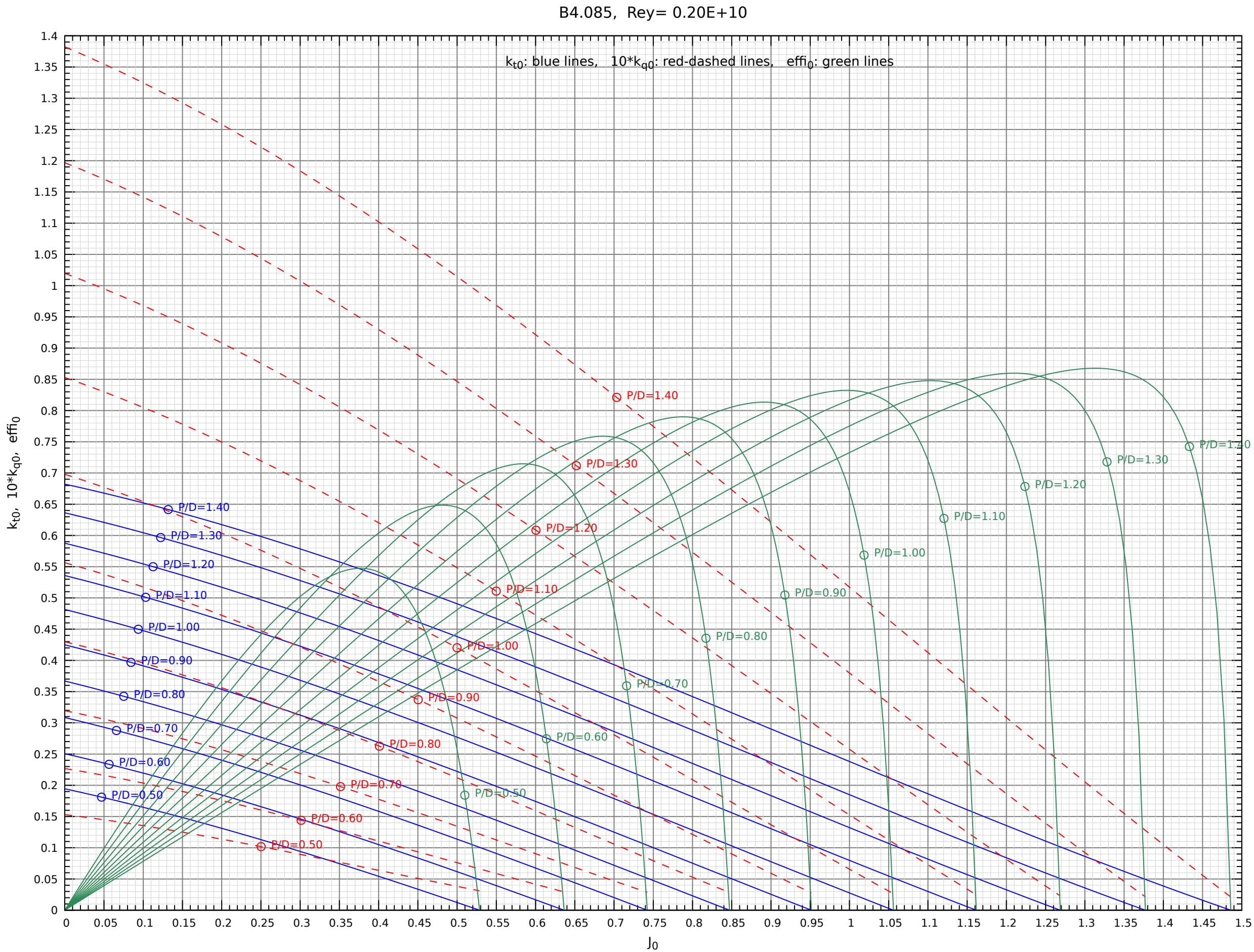
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.085, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.085, Rey= 0.20E+09




B4.085, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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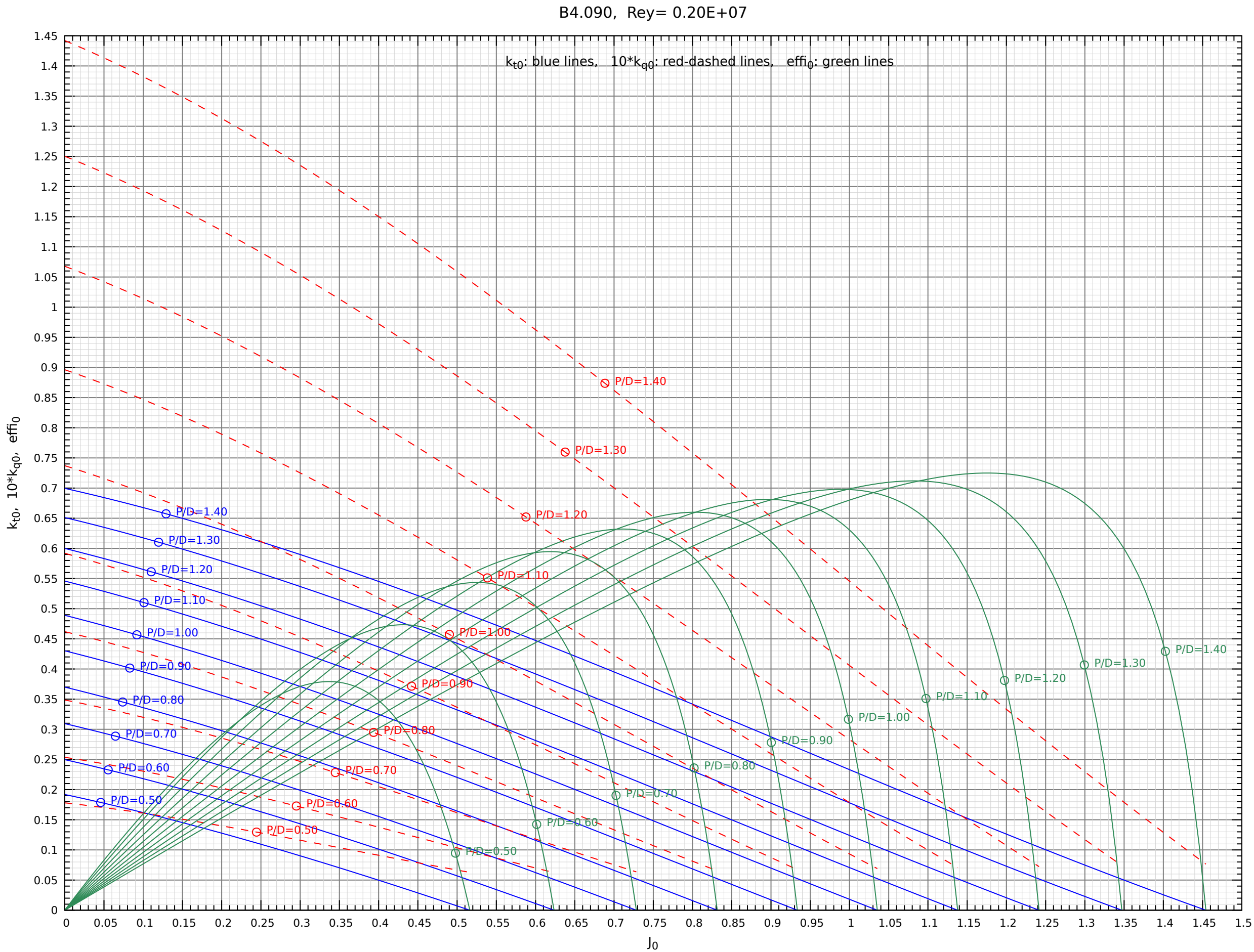
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.090, Rey= 0.20E+07
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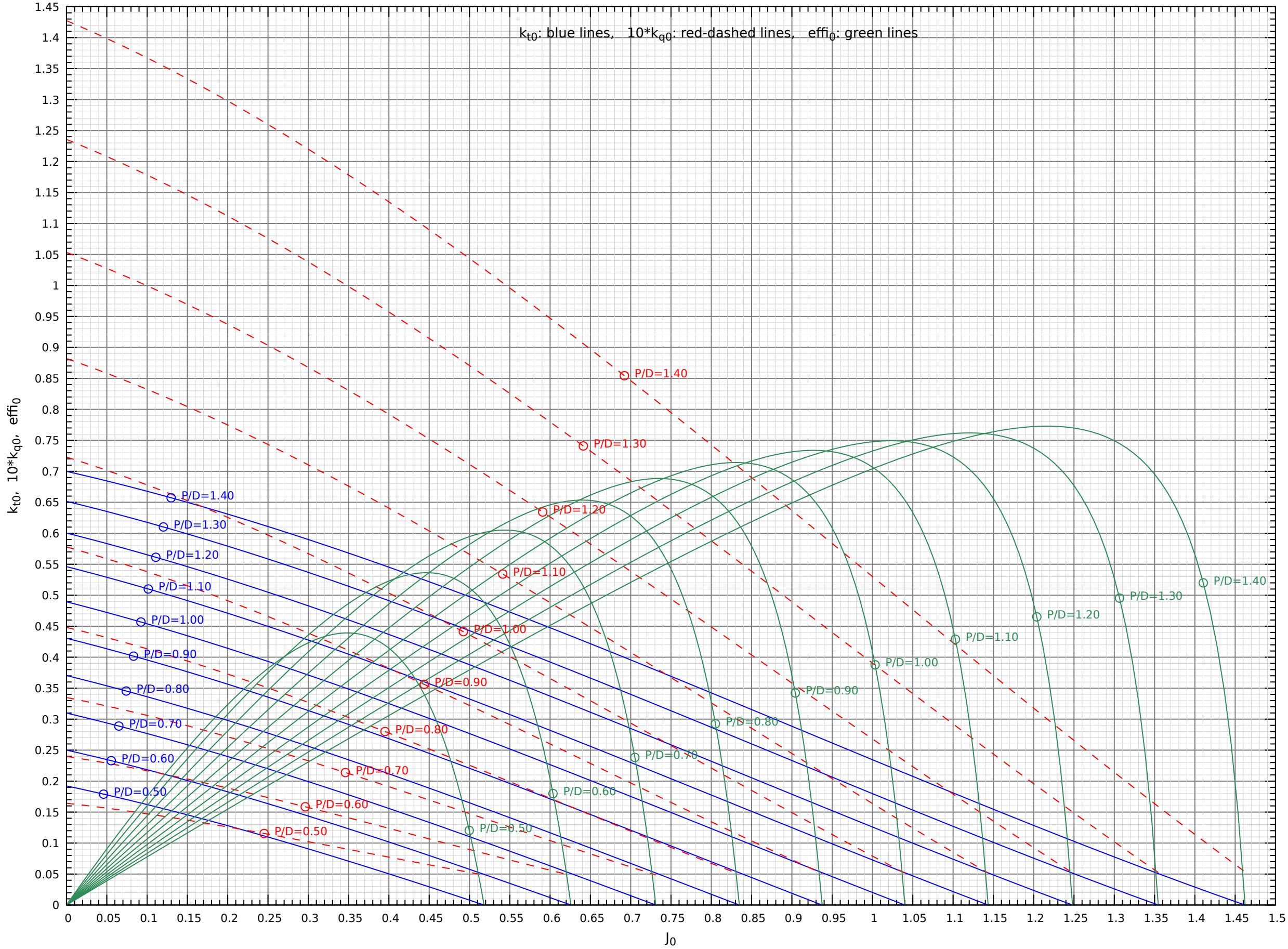
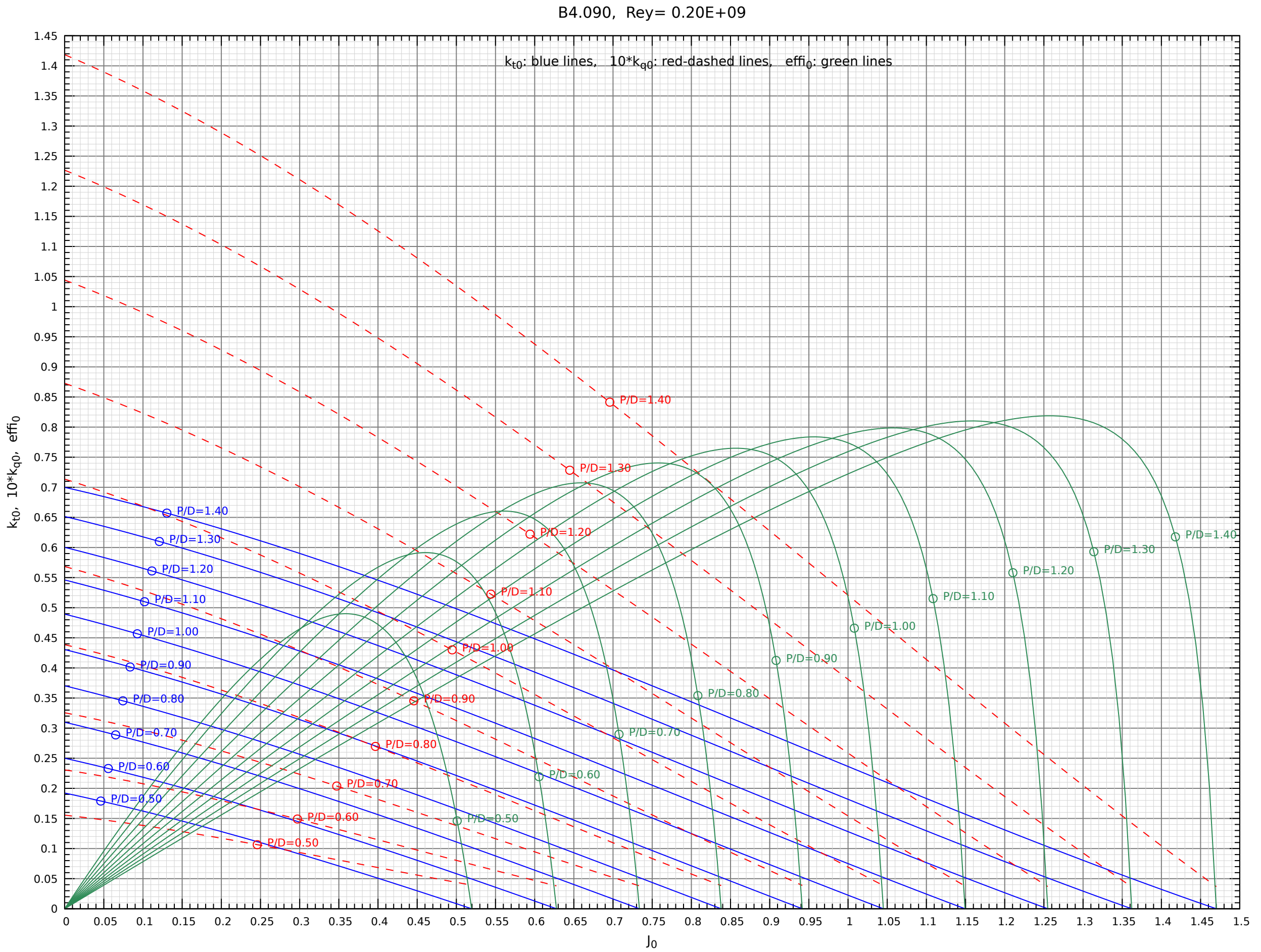
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.090, Rey= 0.20E+08




B4.090, Rey= 0.20E+09
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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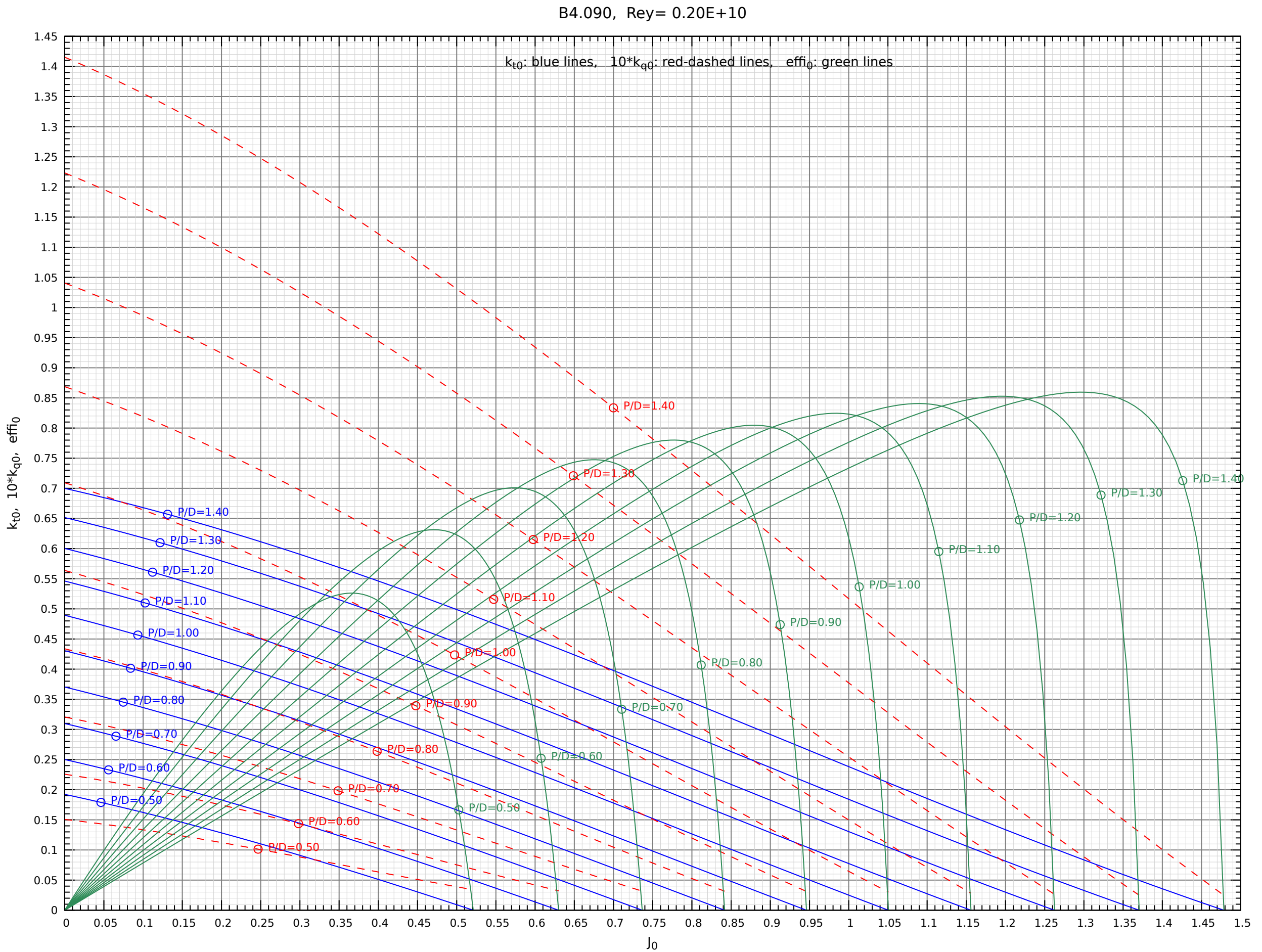
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
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J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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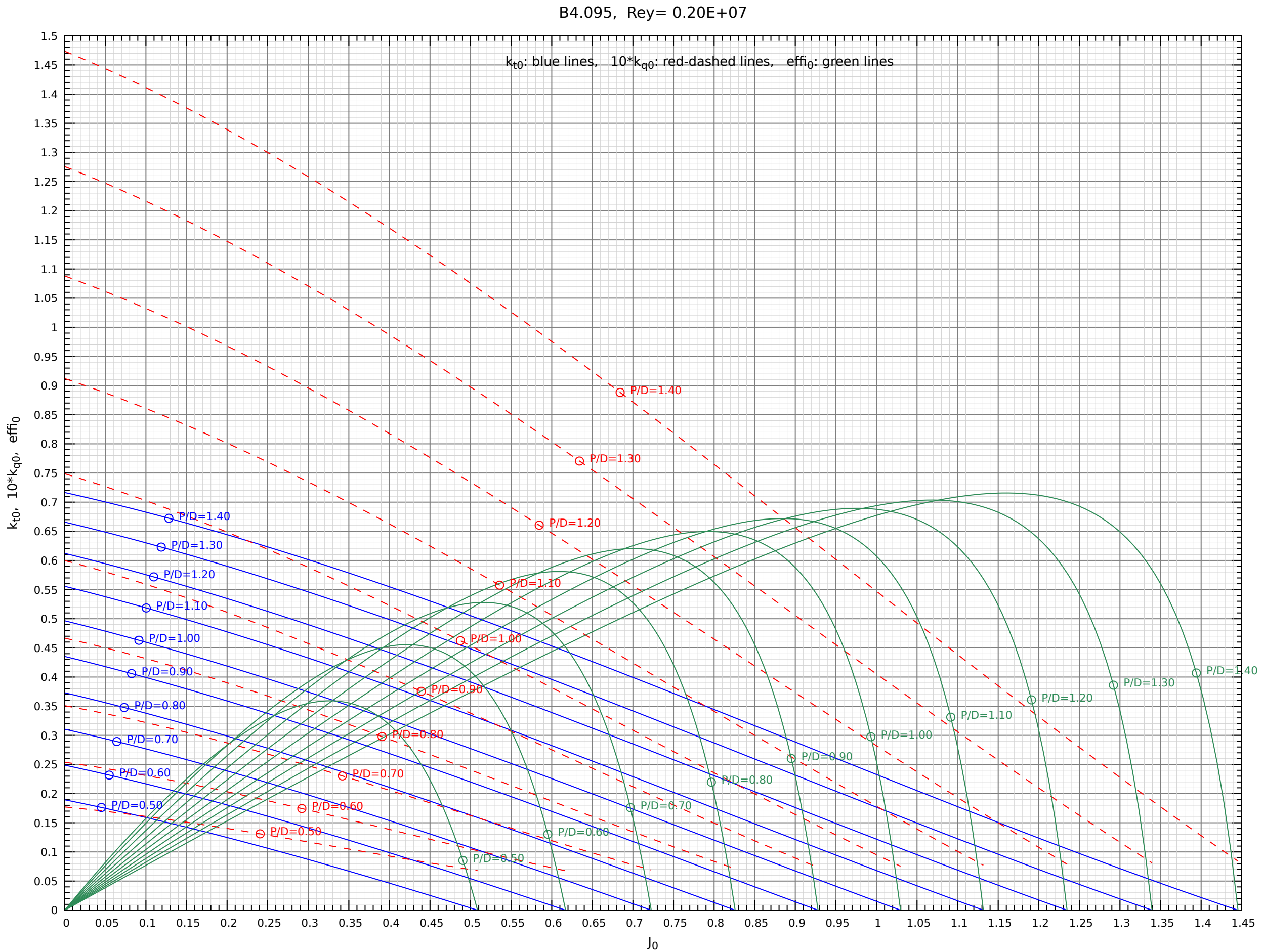
P/D=0.60
P/D=0.50


B4.095, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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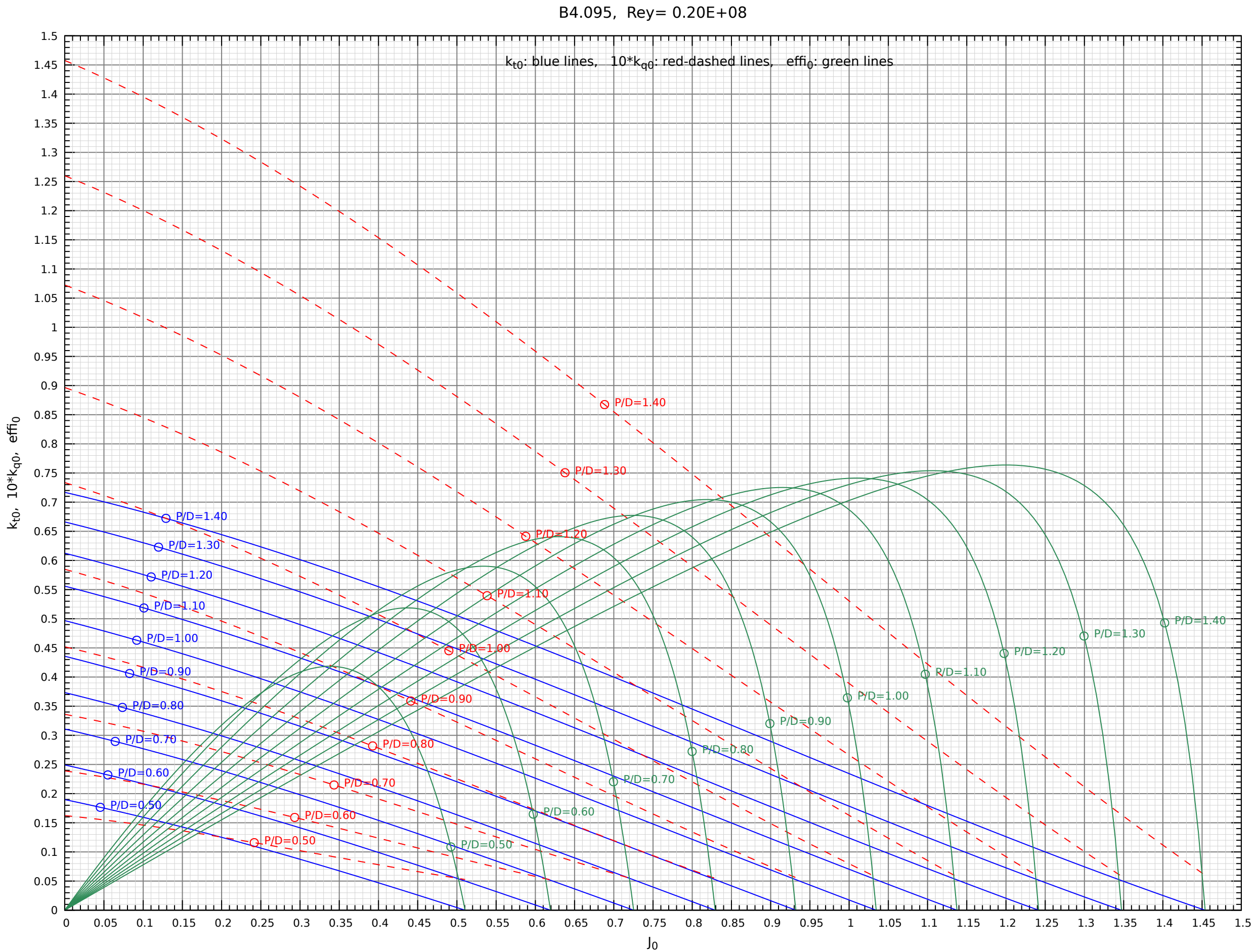
P/D=0.60
P/D=0.50


B4.095, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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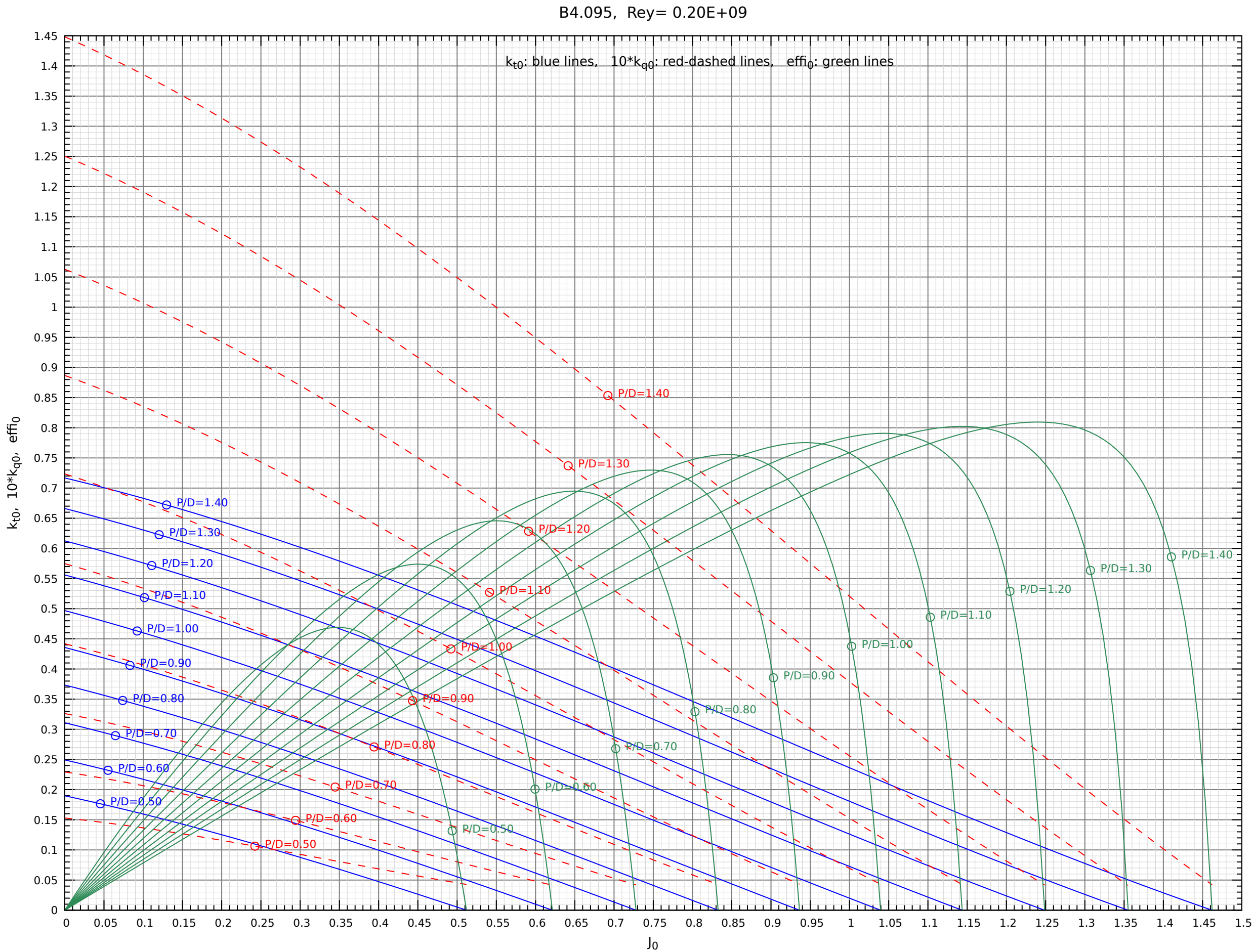
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.095, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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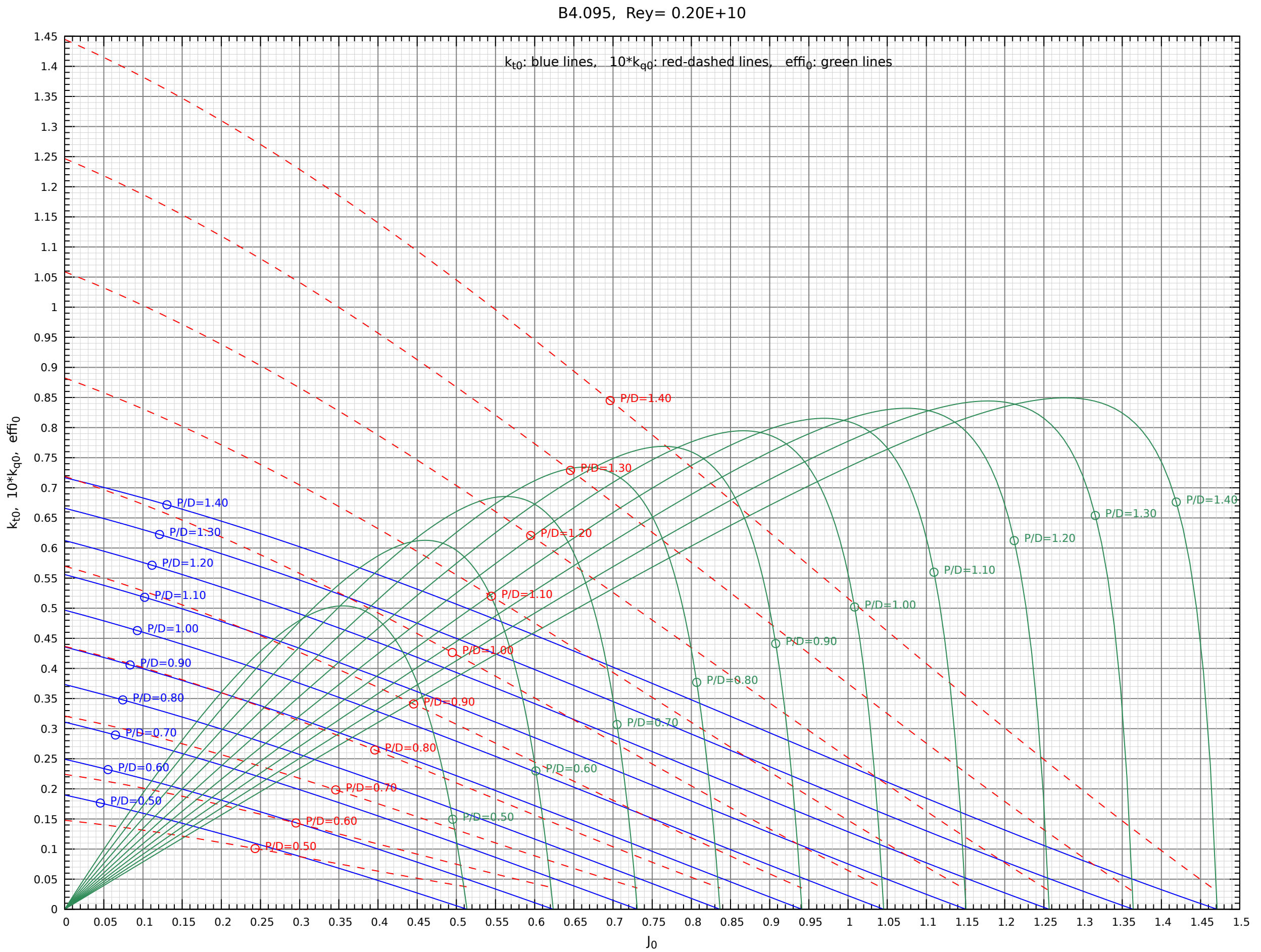
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.095, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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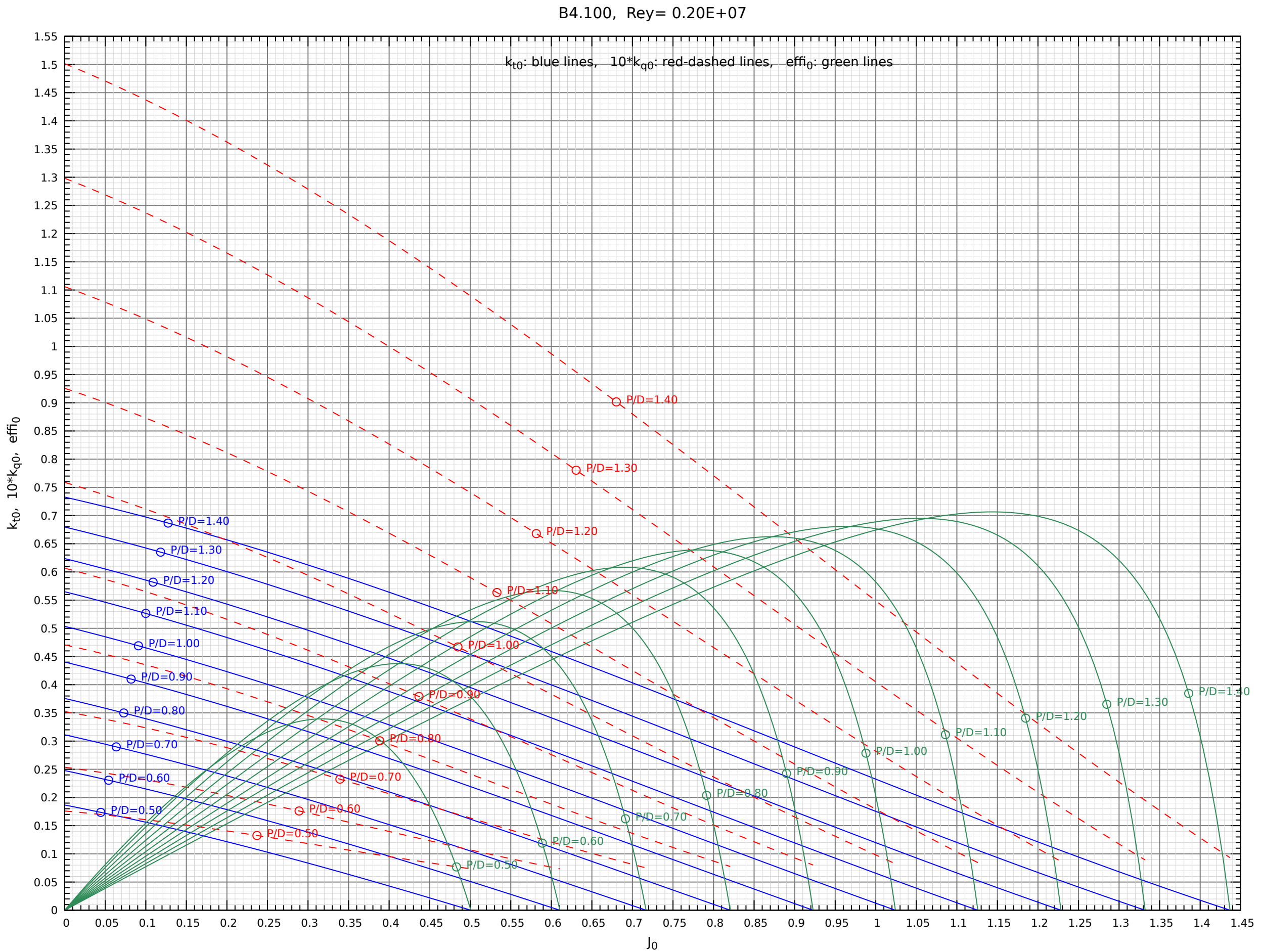
B4.100, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
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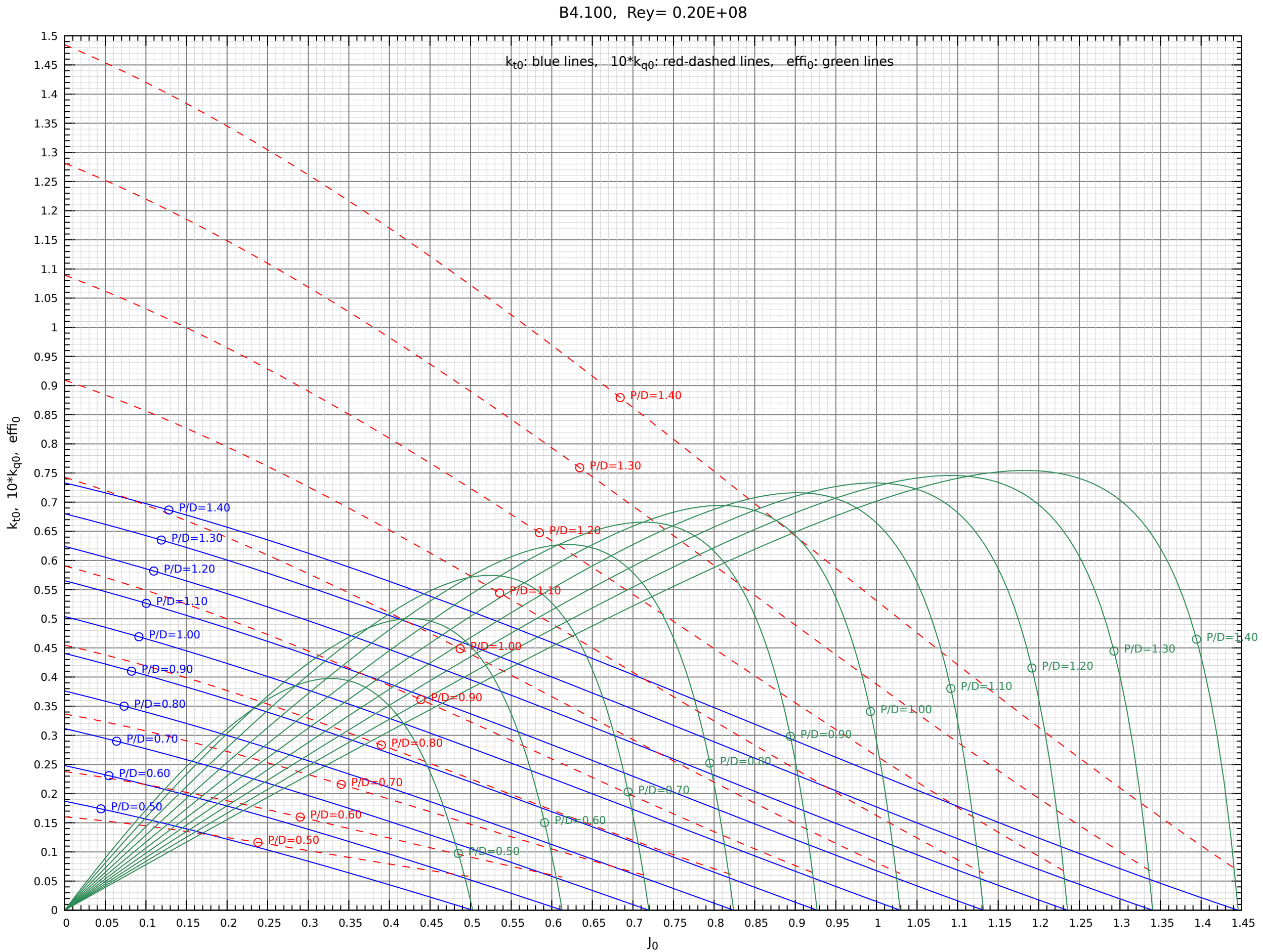
P/D=0.60
P/D=0.50


B4.100, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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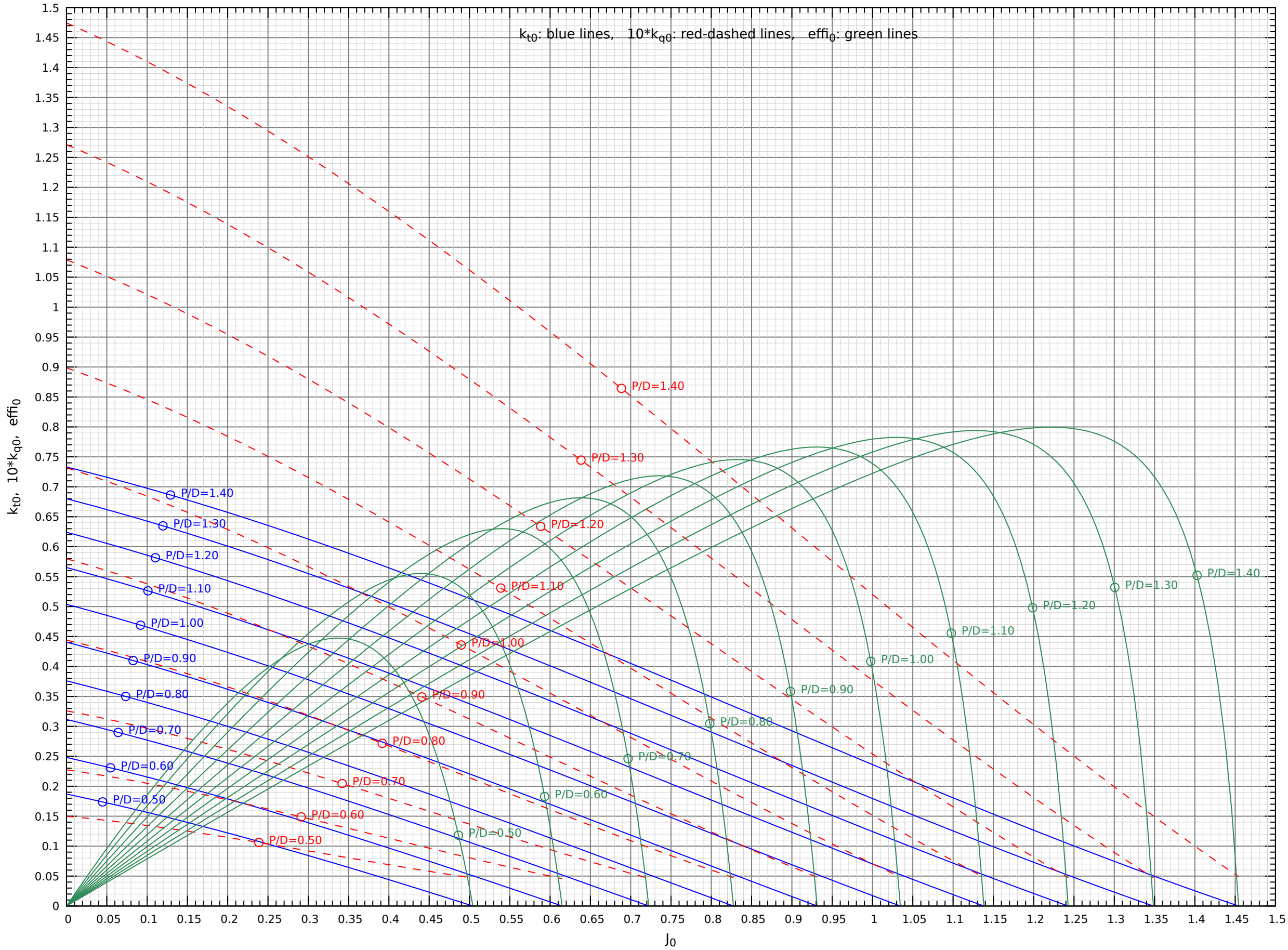
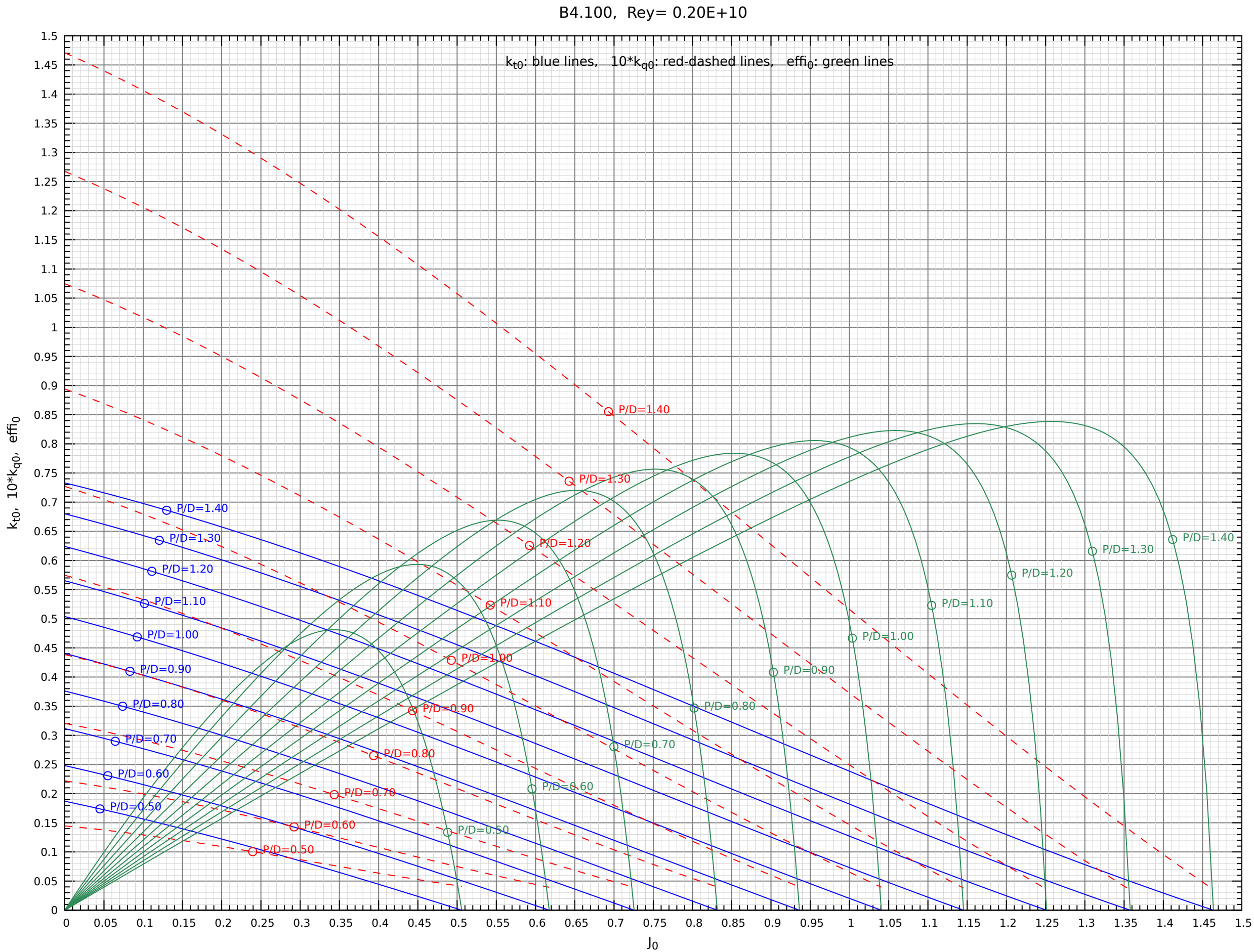
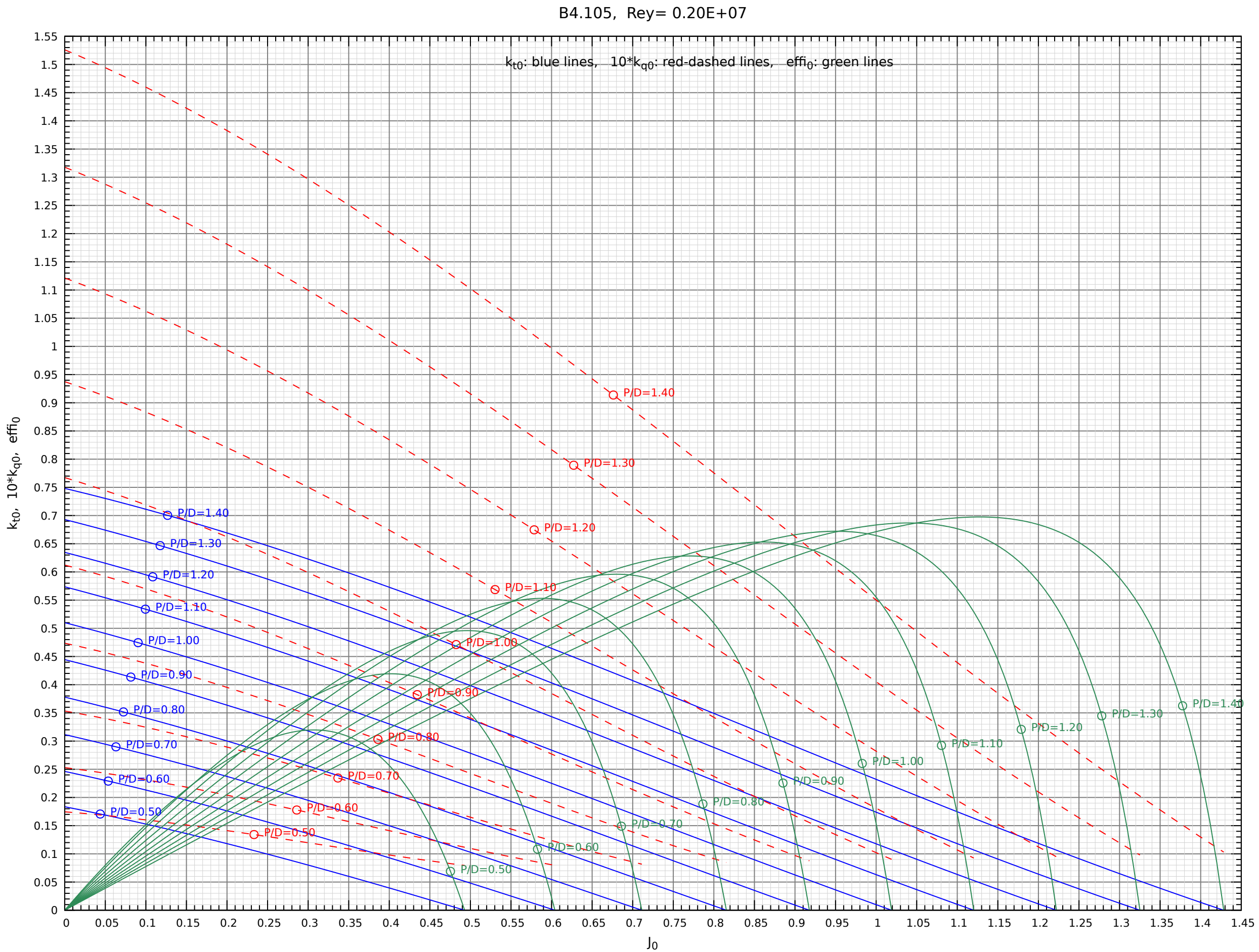
P/D=0.70
P/D=0.60
P/D=0.50

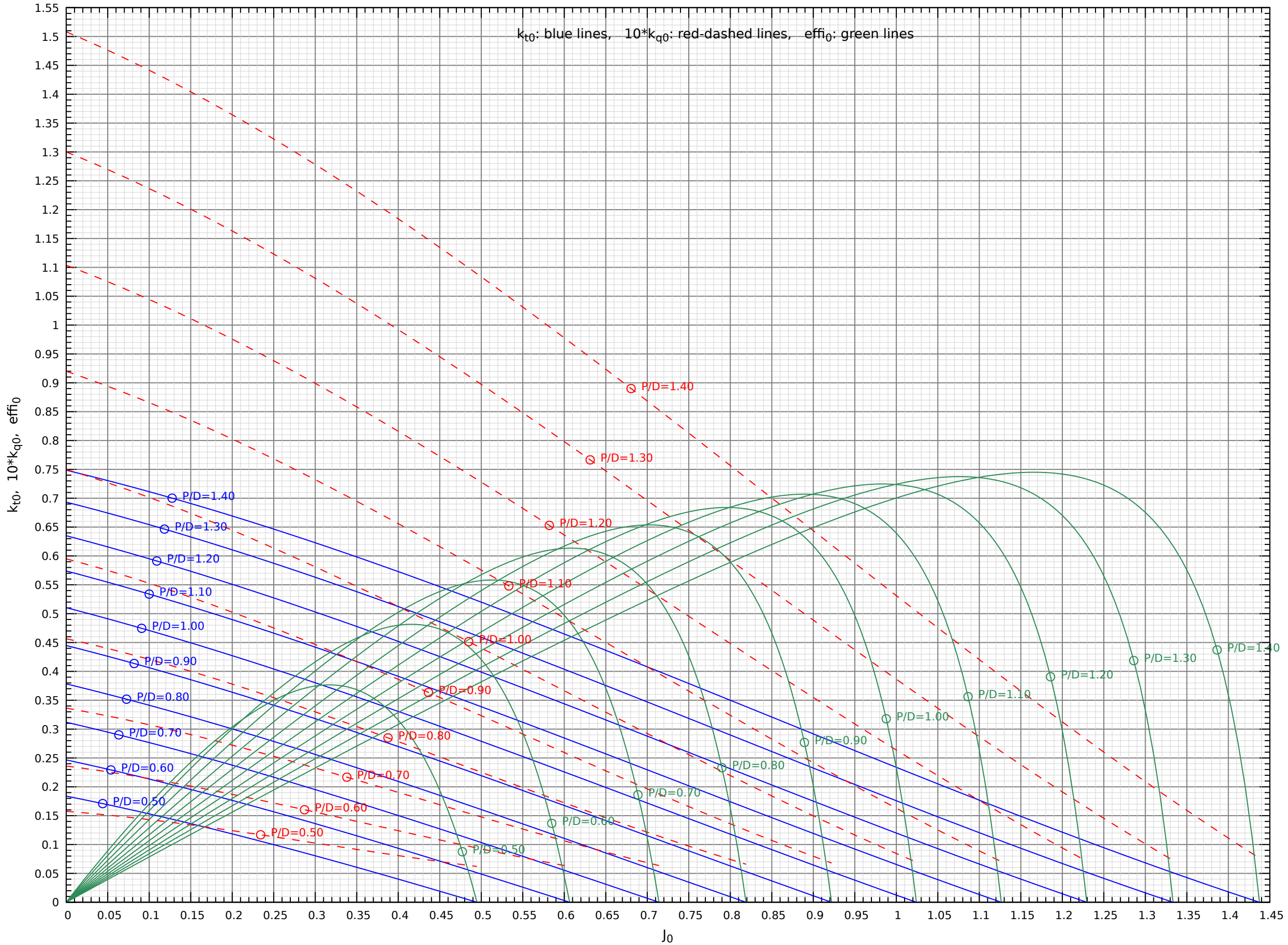
B4.100, Rey= 0.20E+09

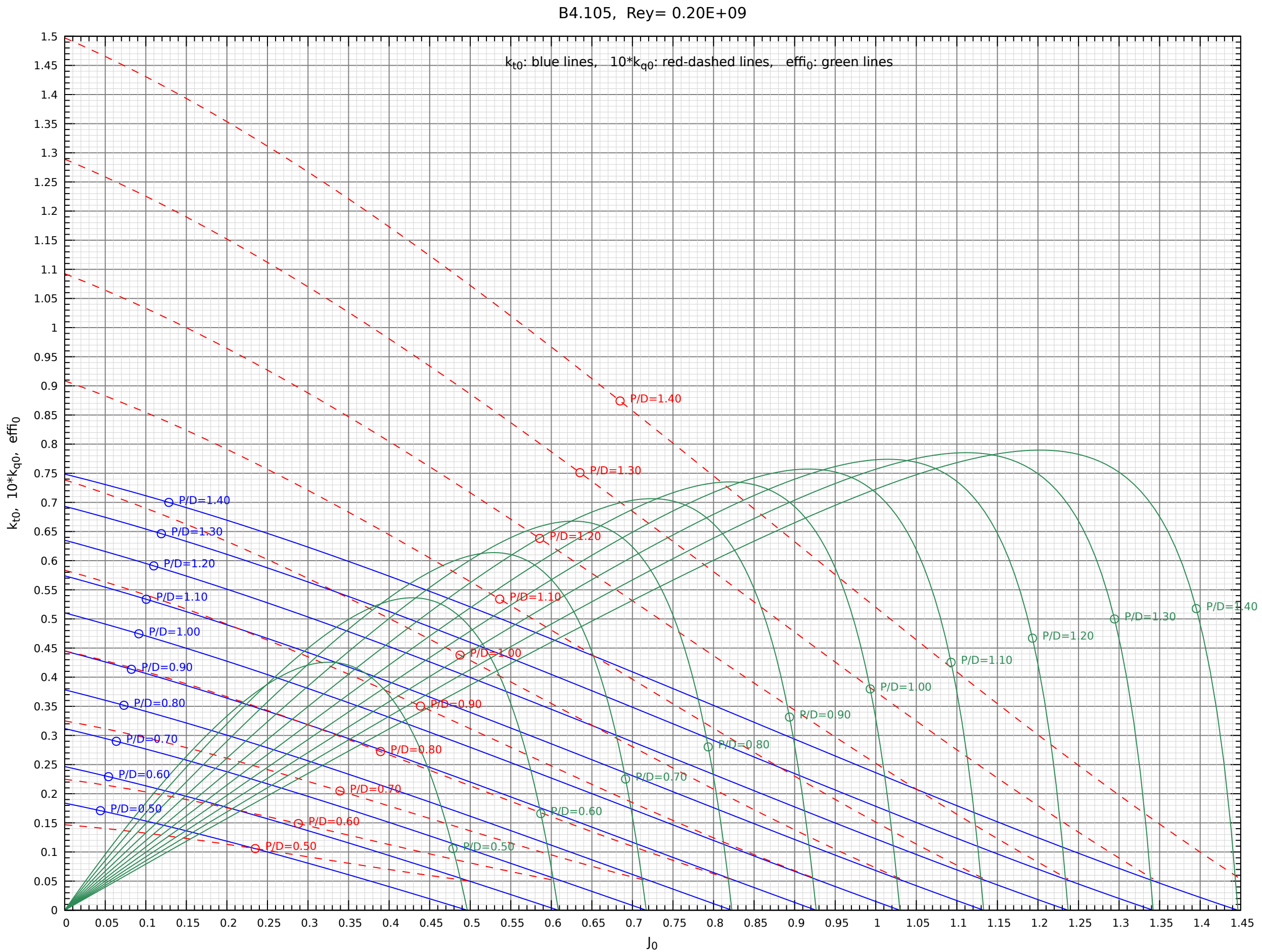


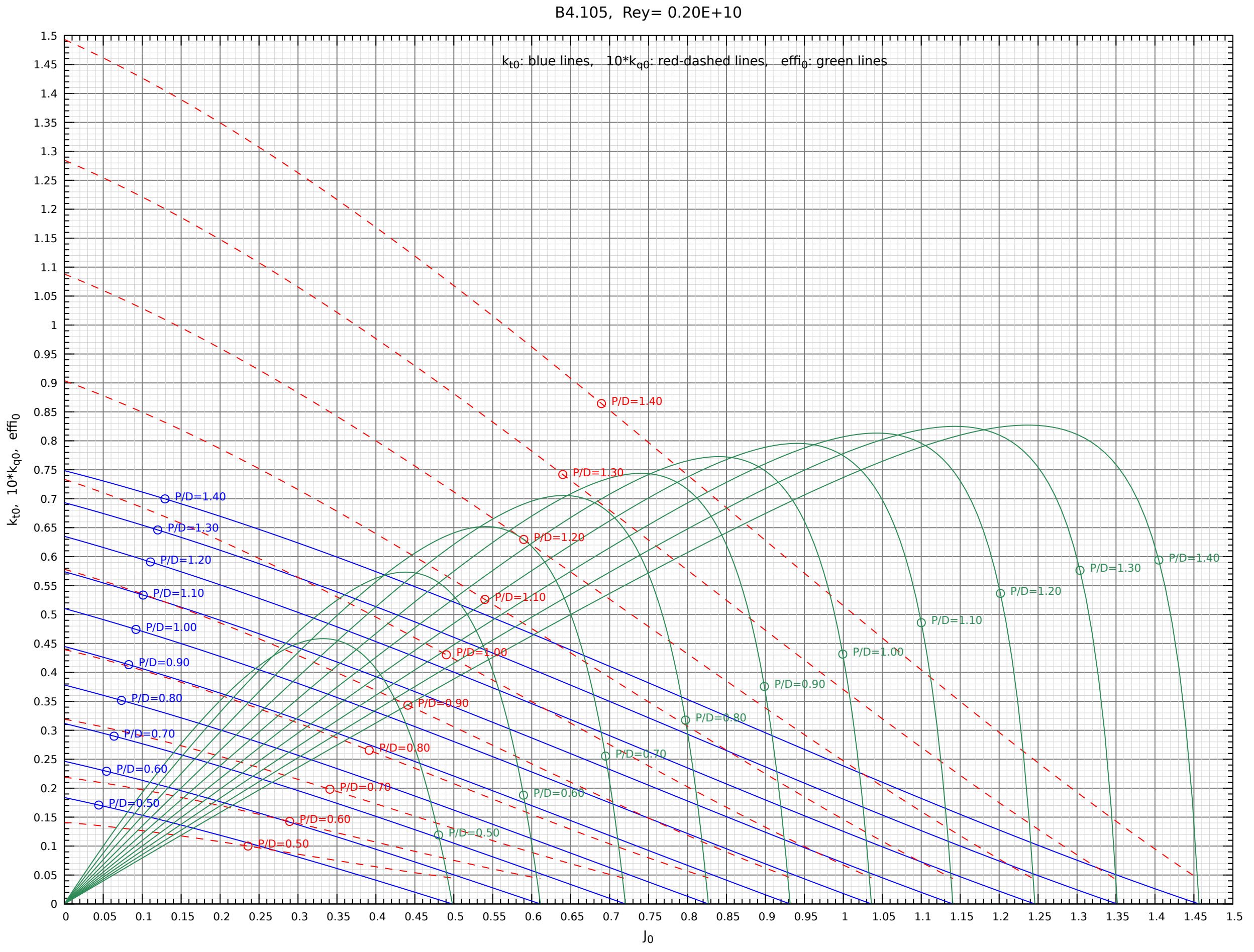

B4.100, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.105, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B4.105, Rey= 0.20E+08




B4.105, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B4.105, Rey= 0.20E+10
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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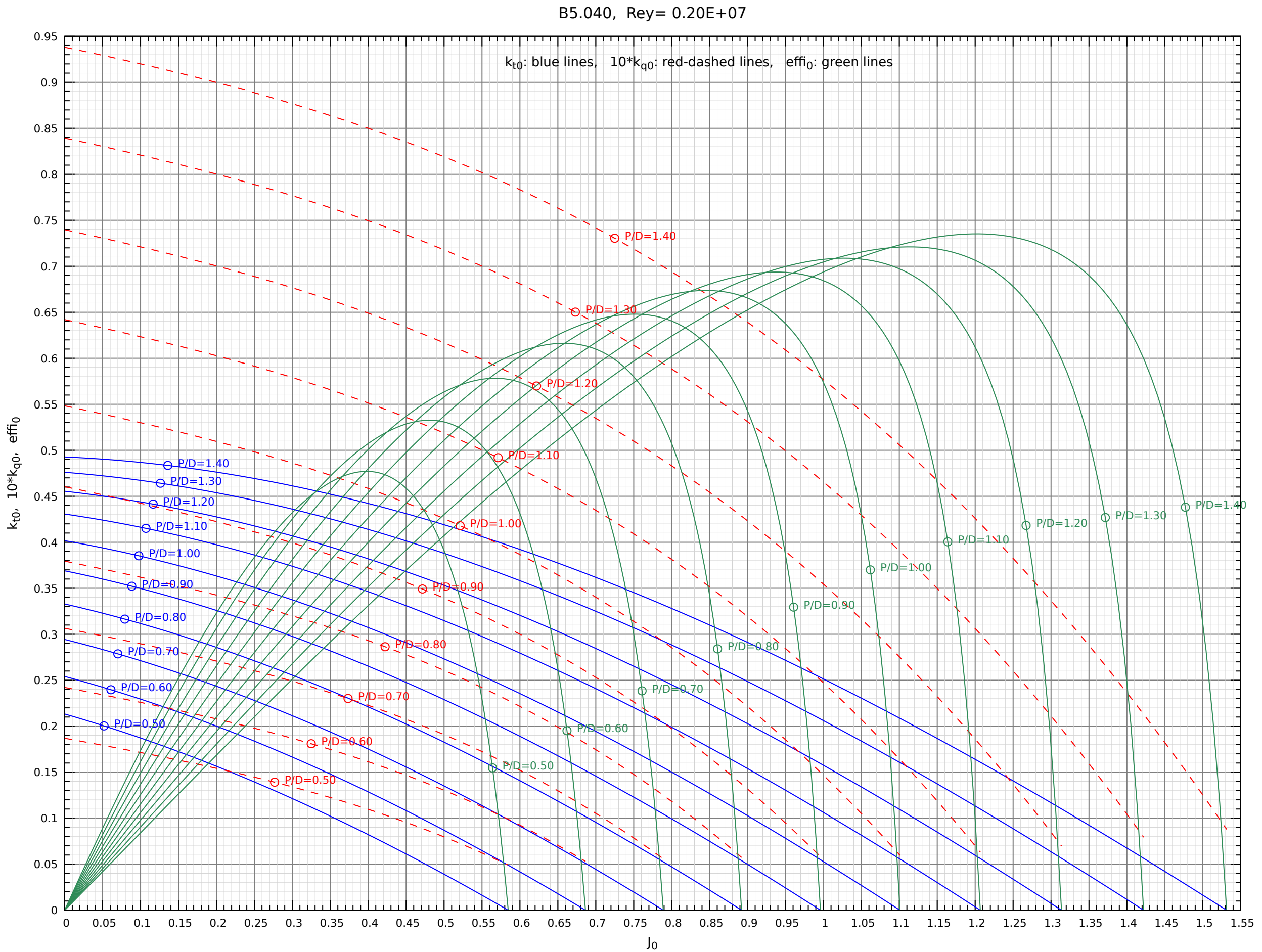
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B5.040, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.30
P/D=1.20
P/D=1.10
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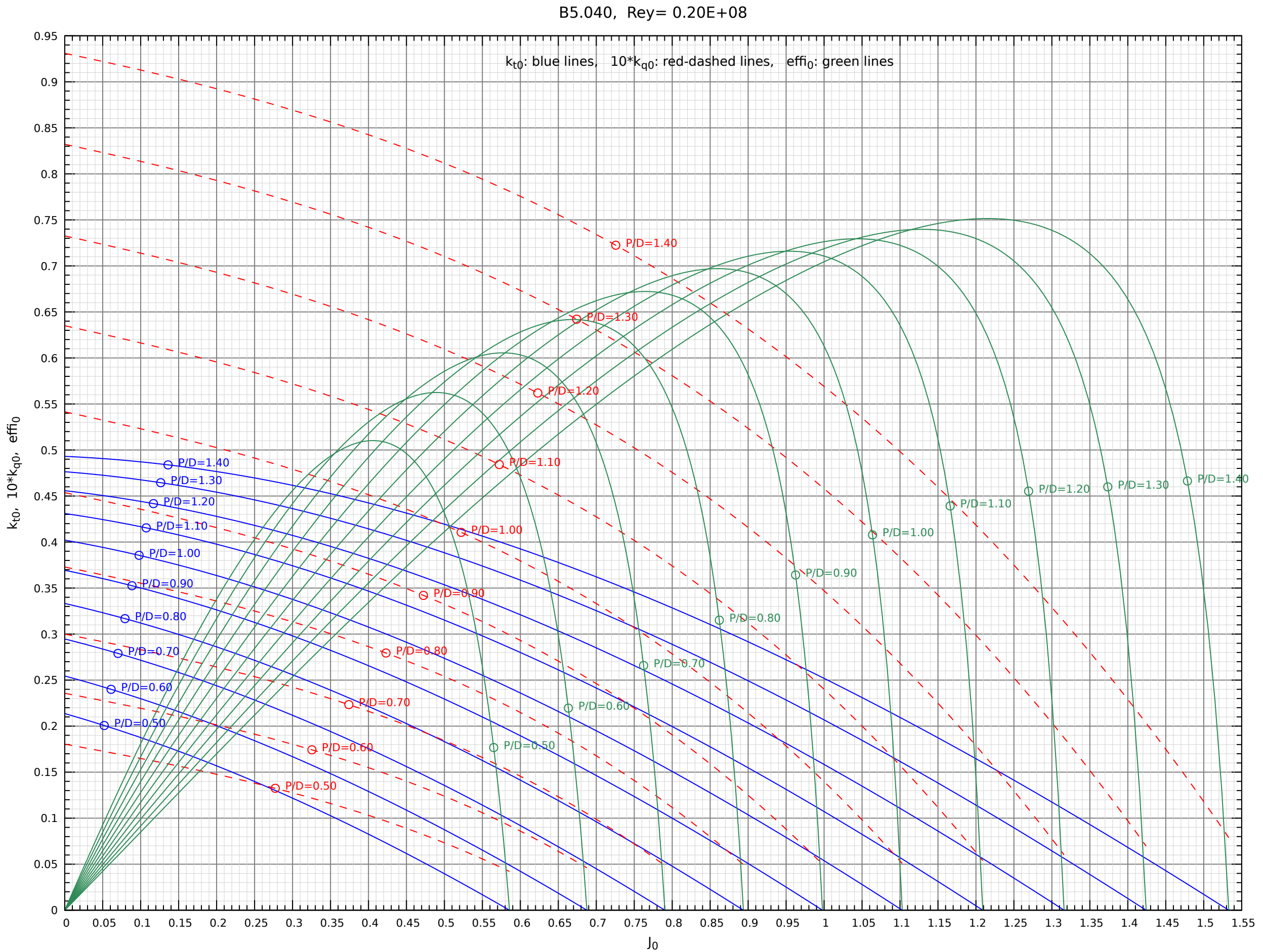
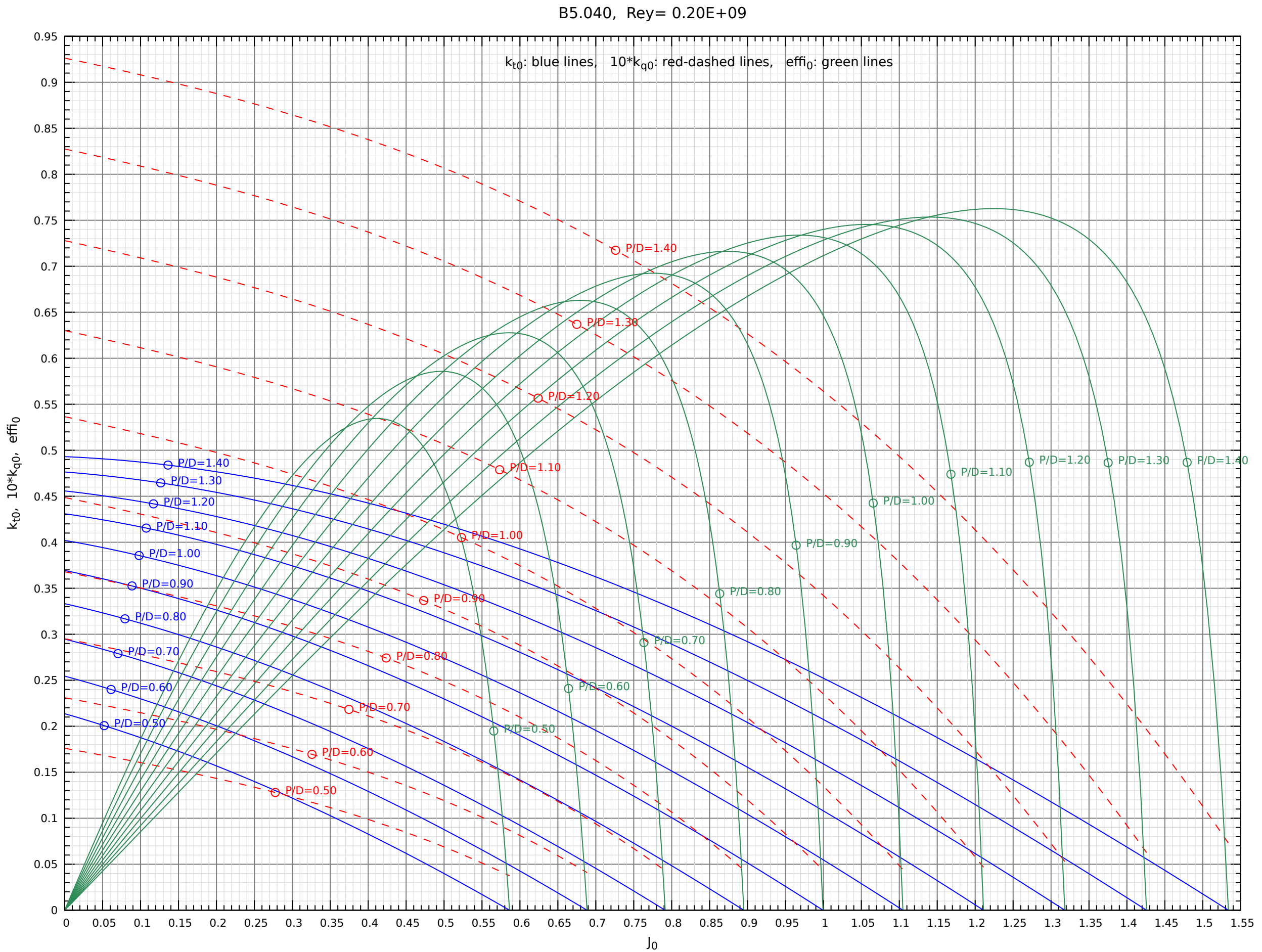
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B5.040, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B5.040, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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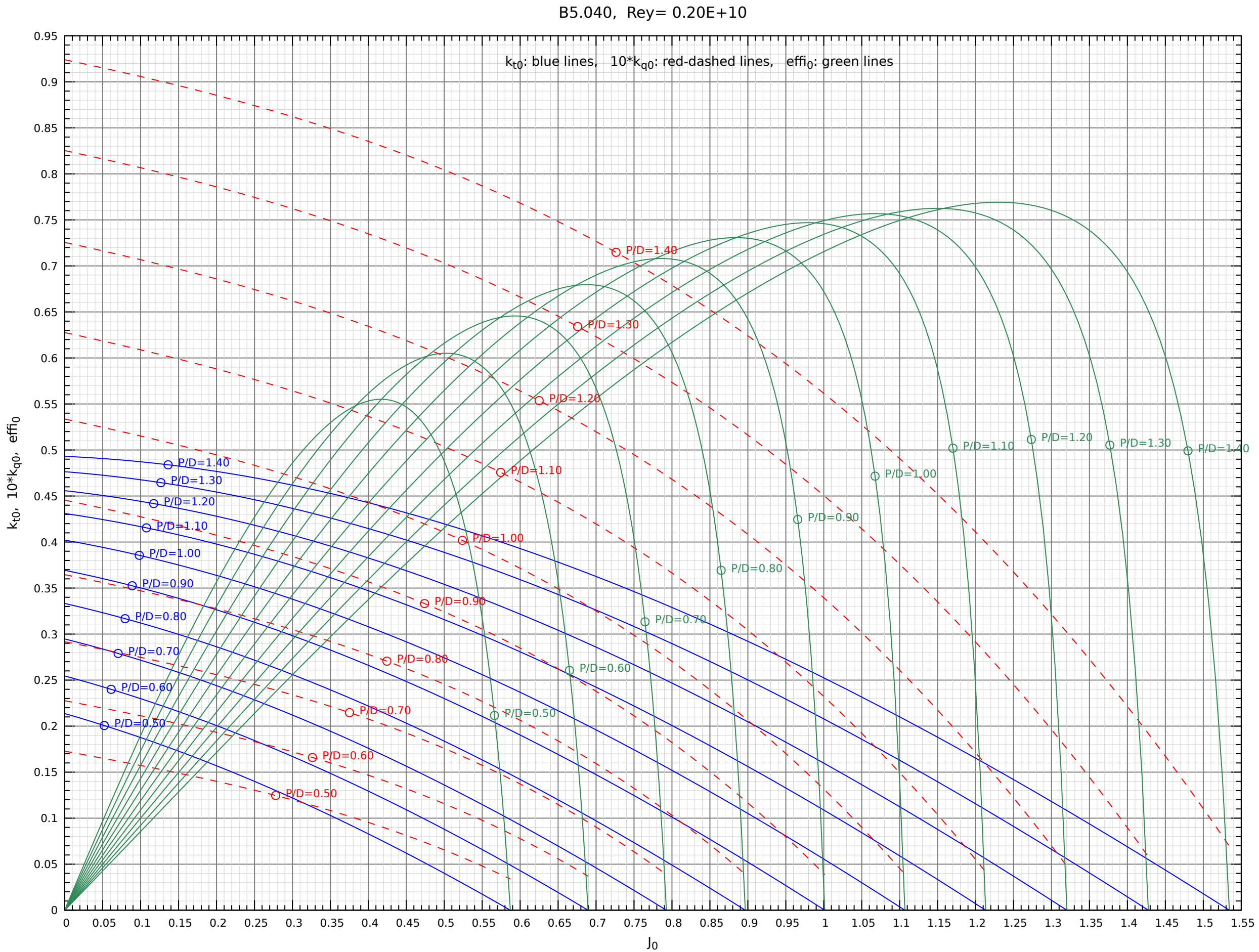
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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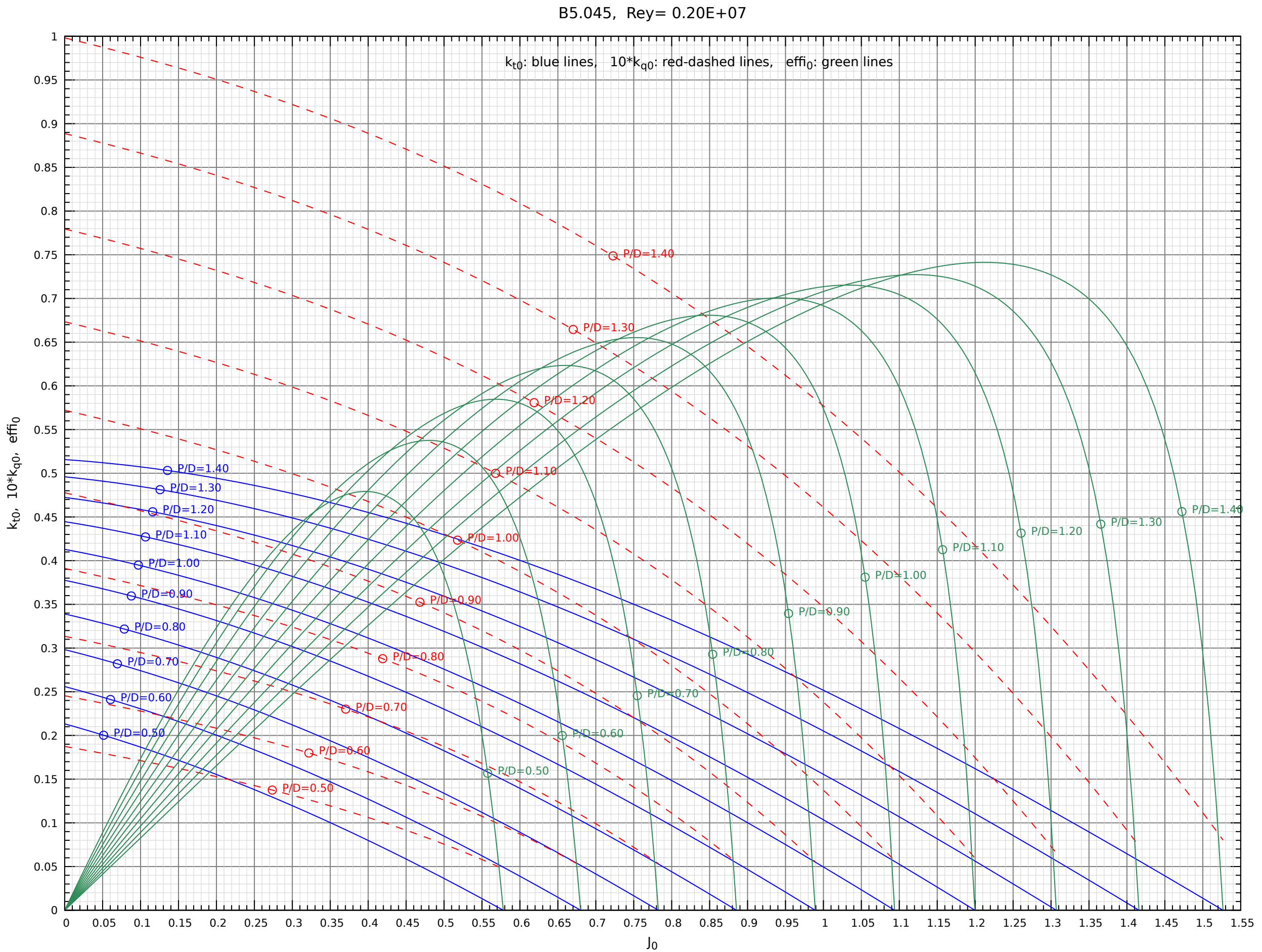
P/D=0.60
P/D=0.50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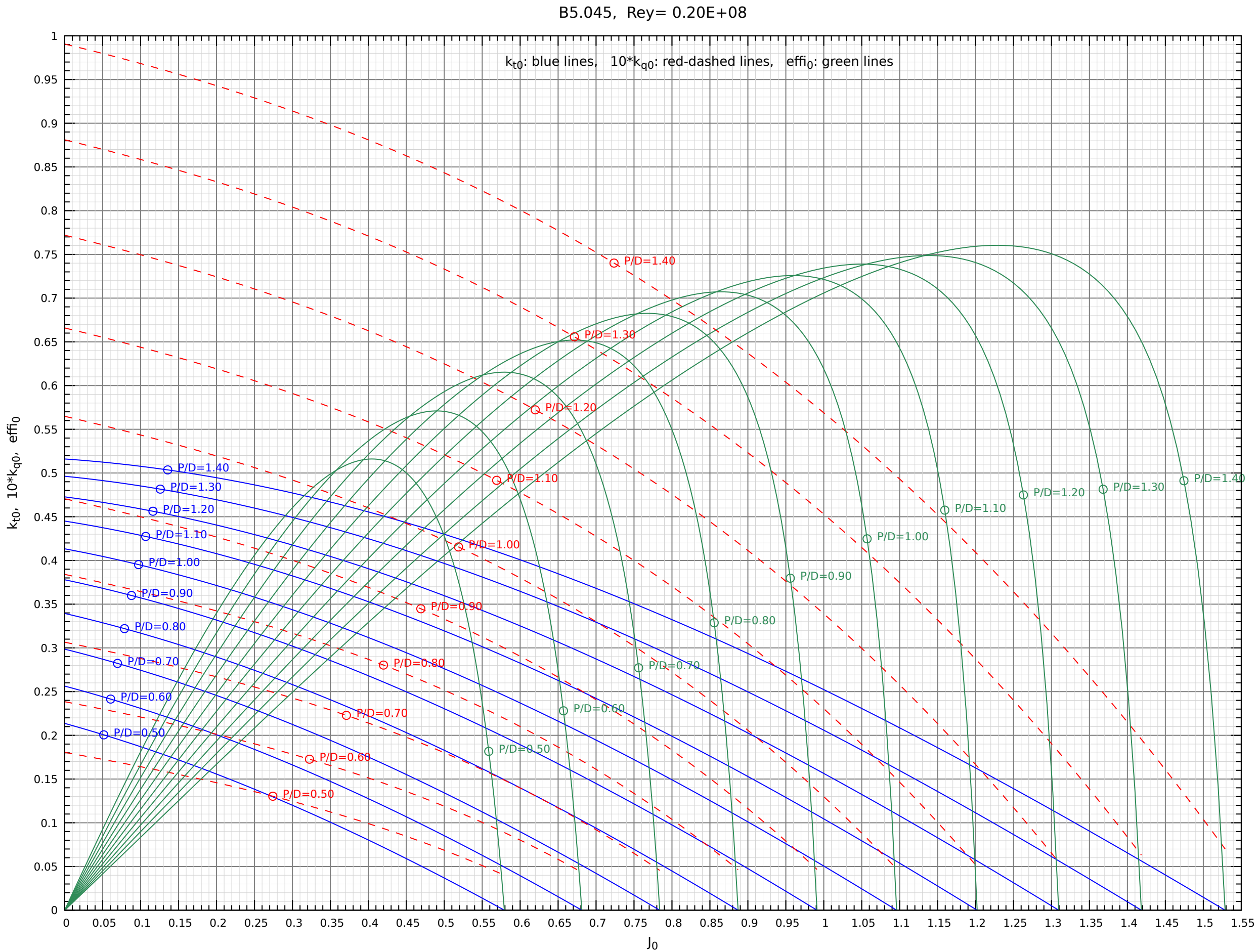
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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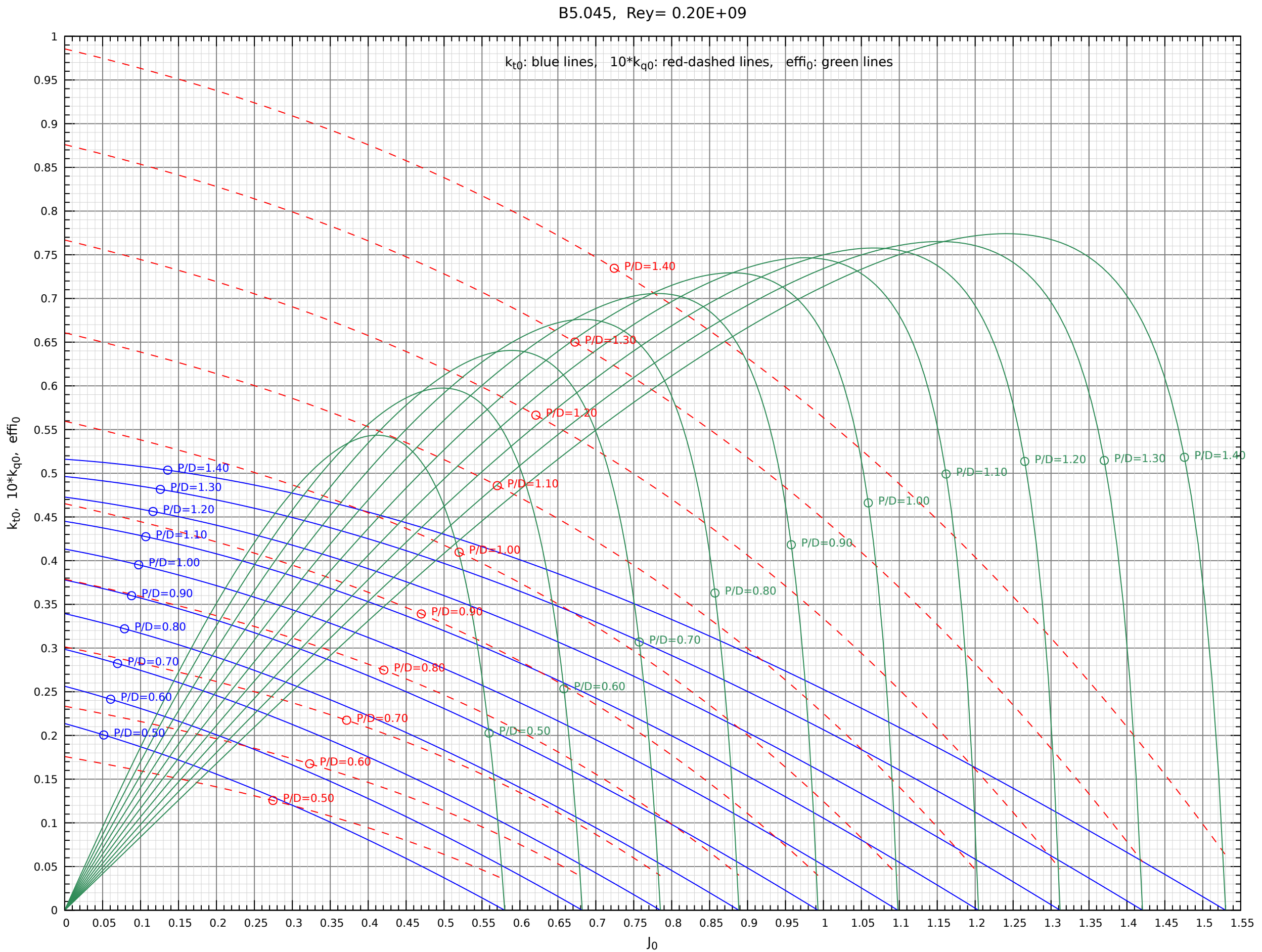
P/D=0.50


B5.045, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.60
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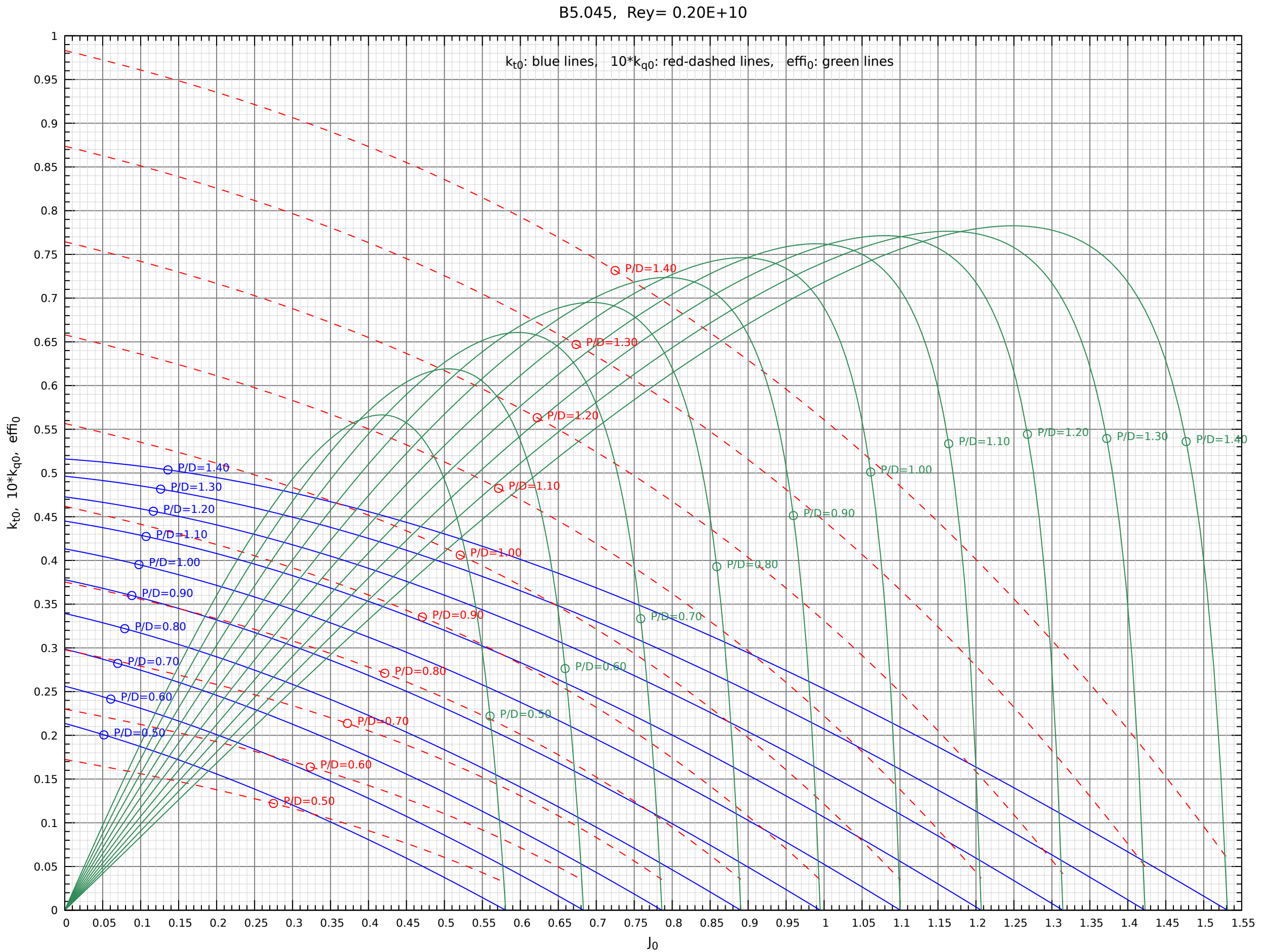
B5.045, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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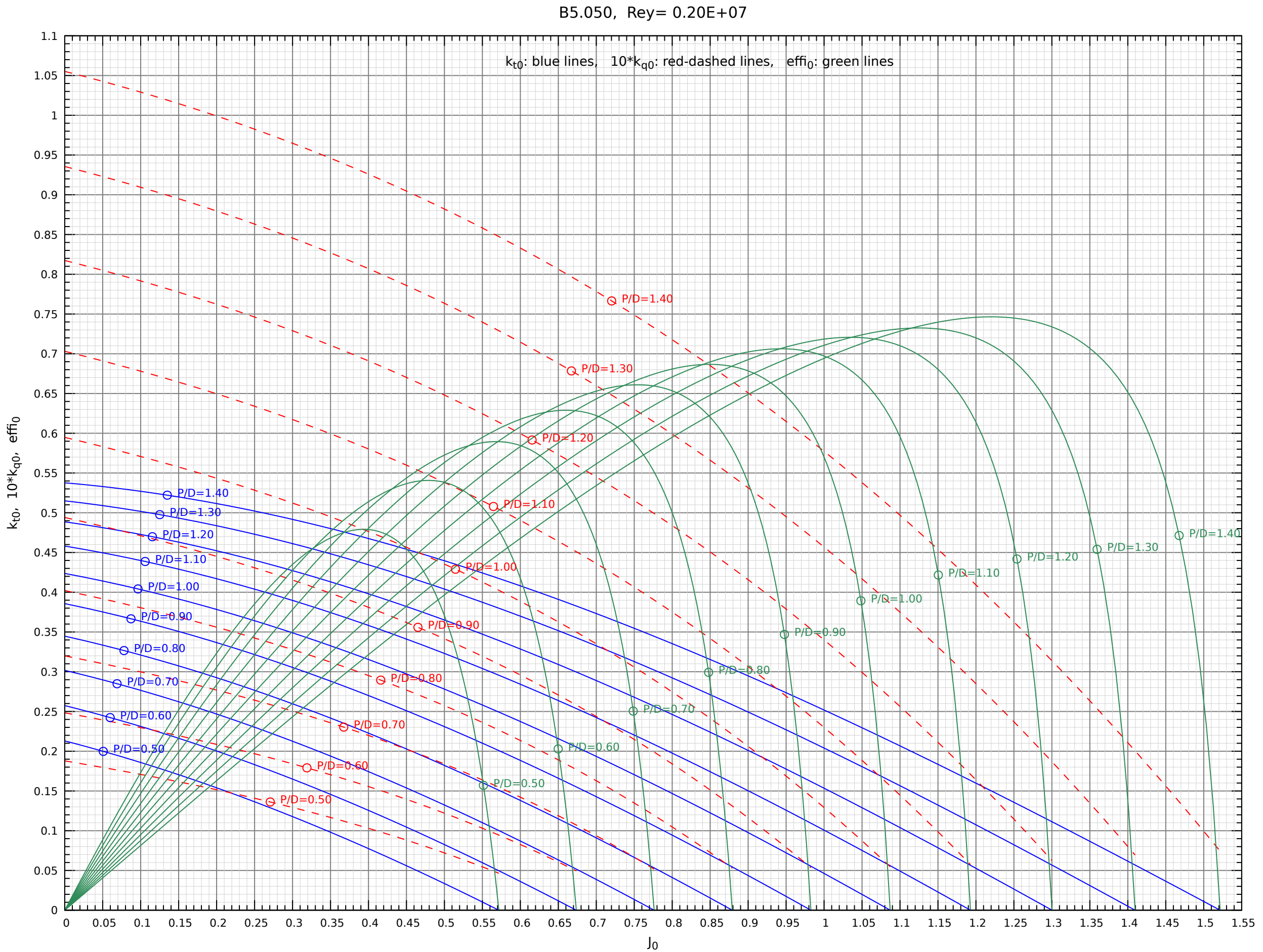
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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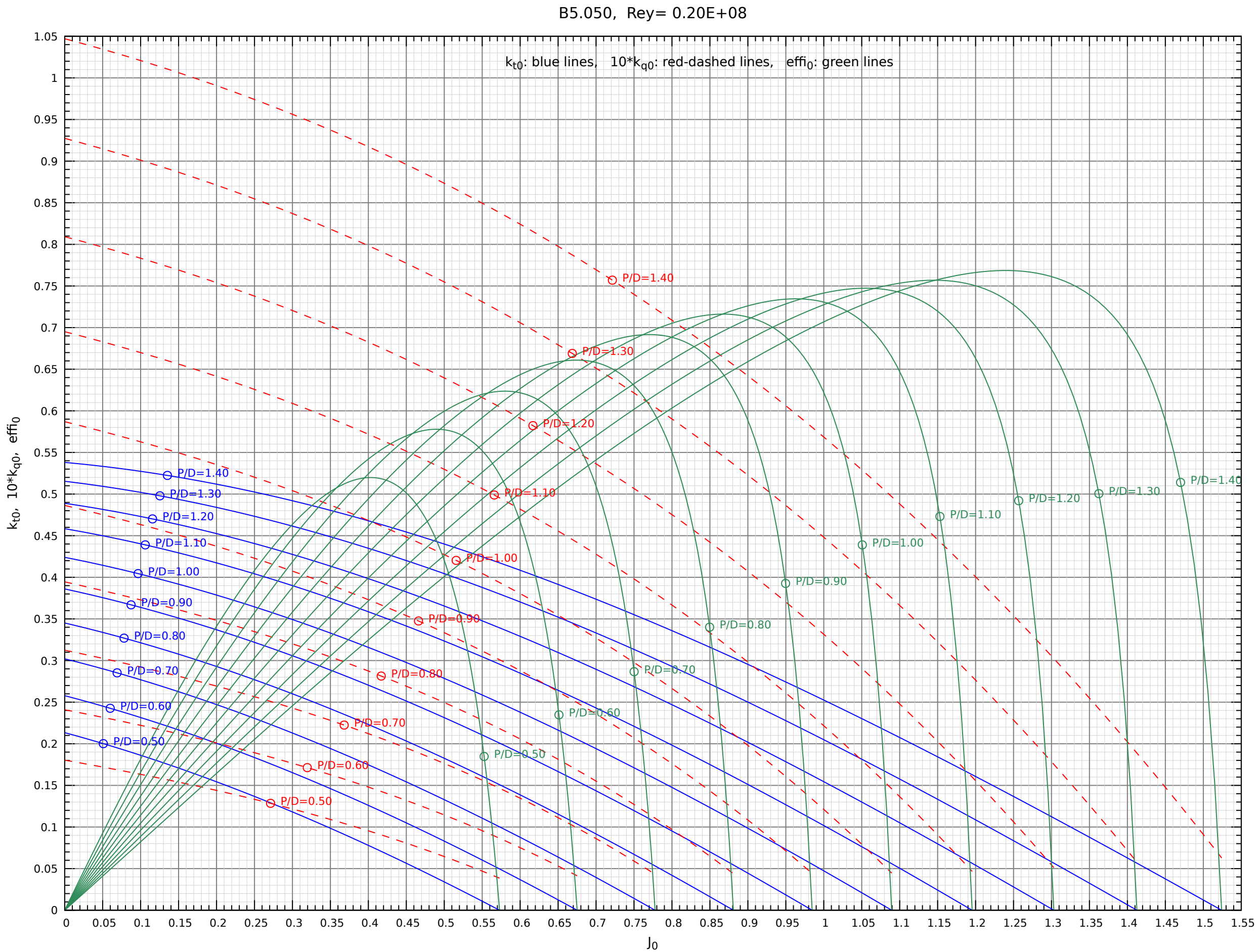
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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P/D=1.20
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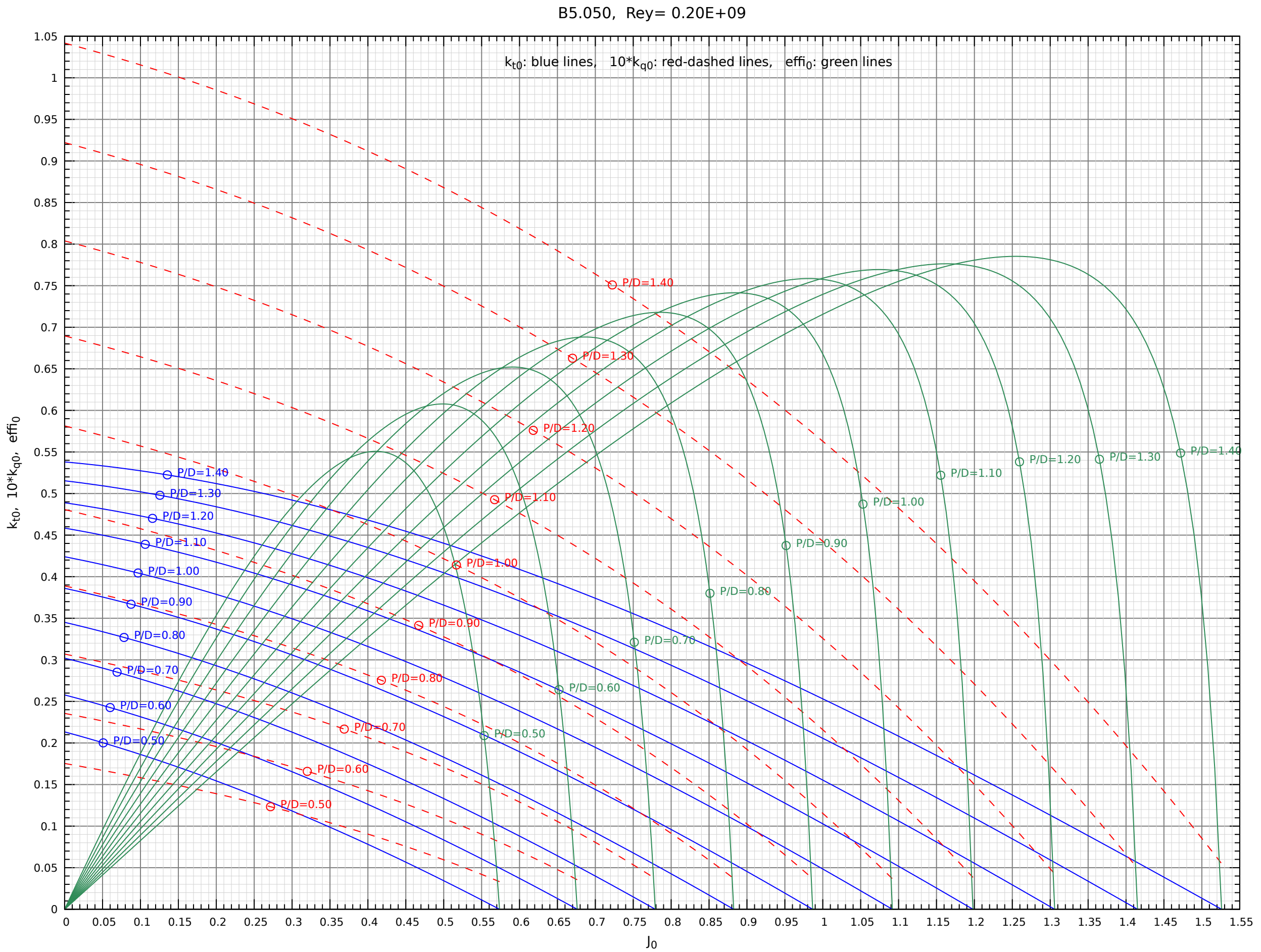
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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P/D=1.20
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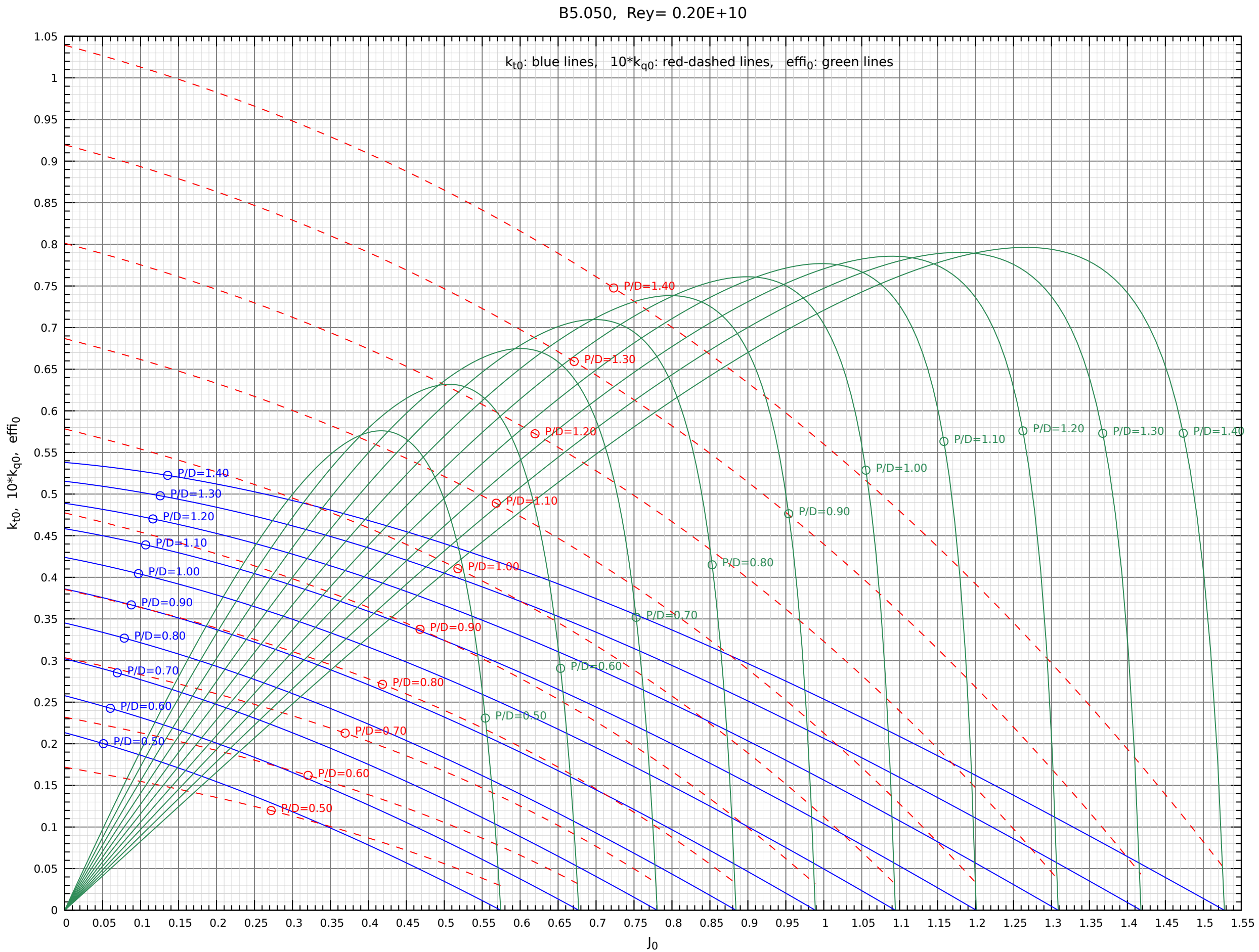
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
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P/D=1.20
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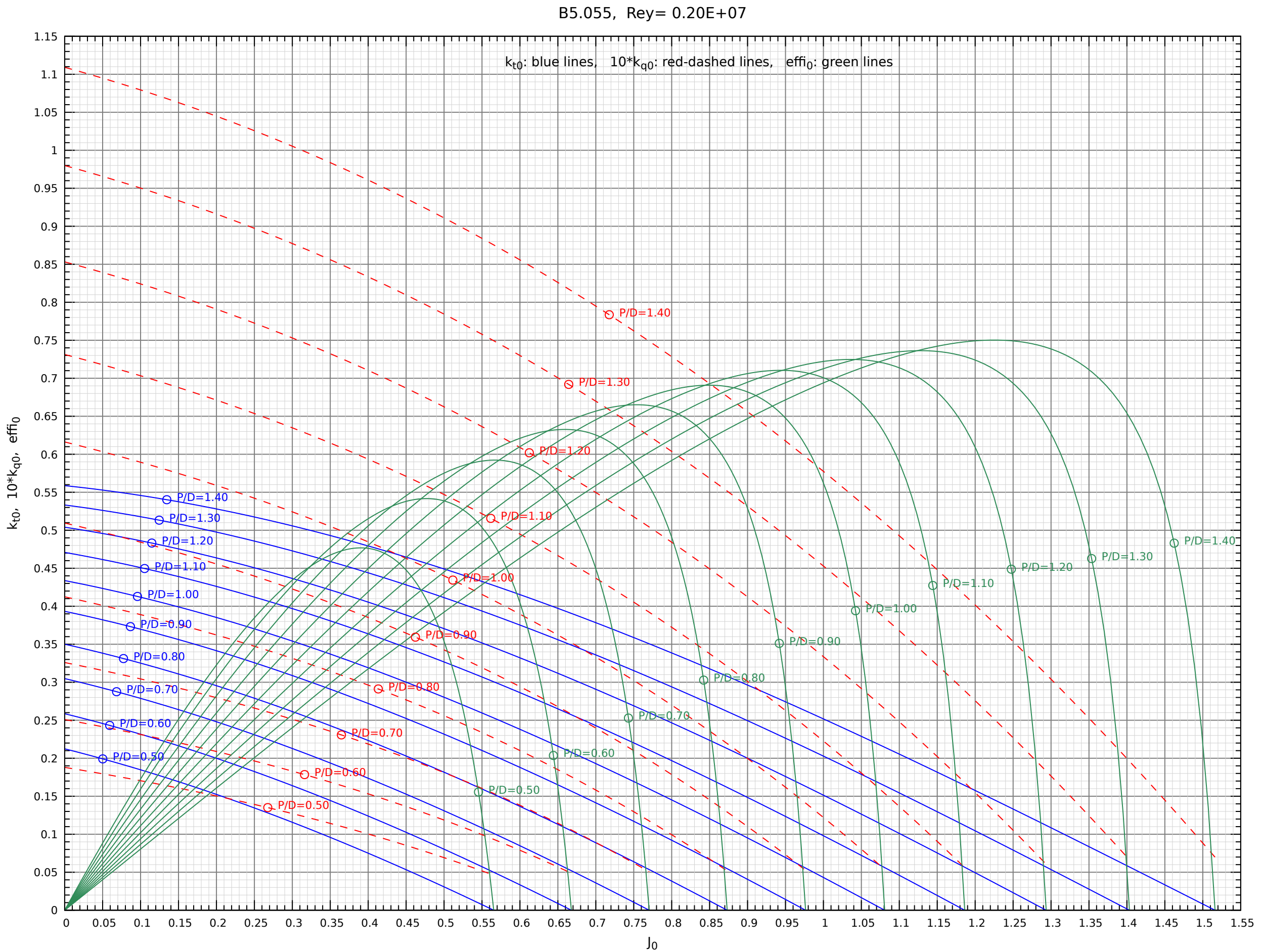
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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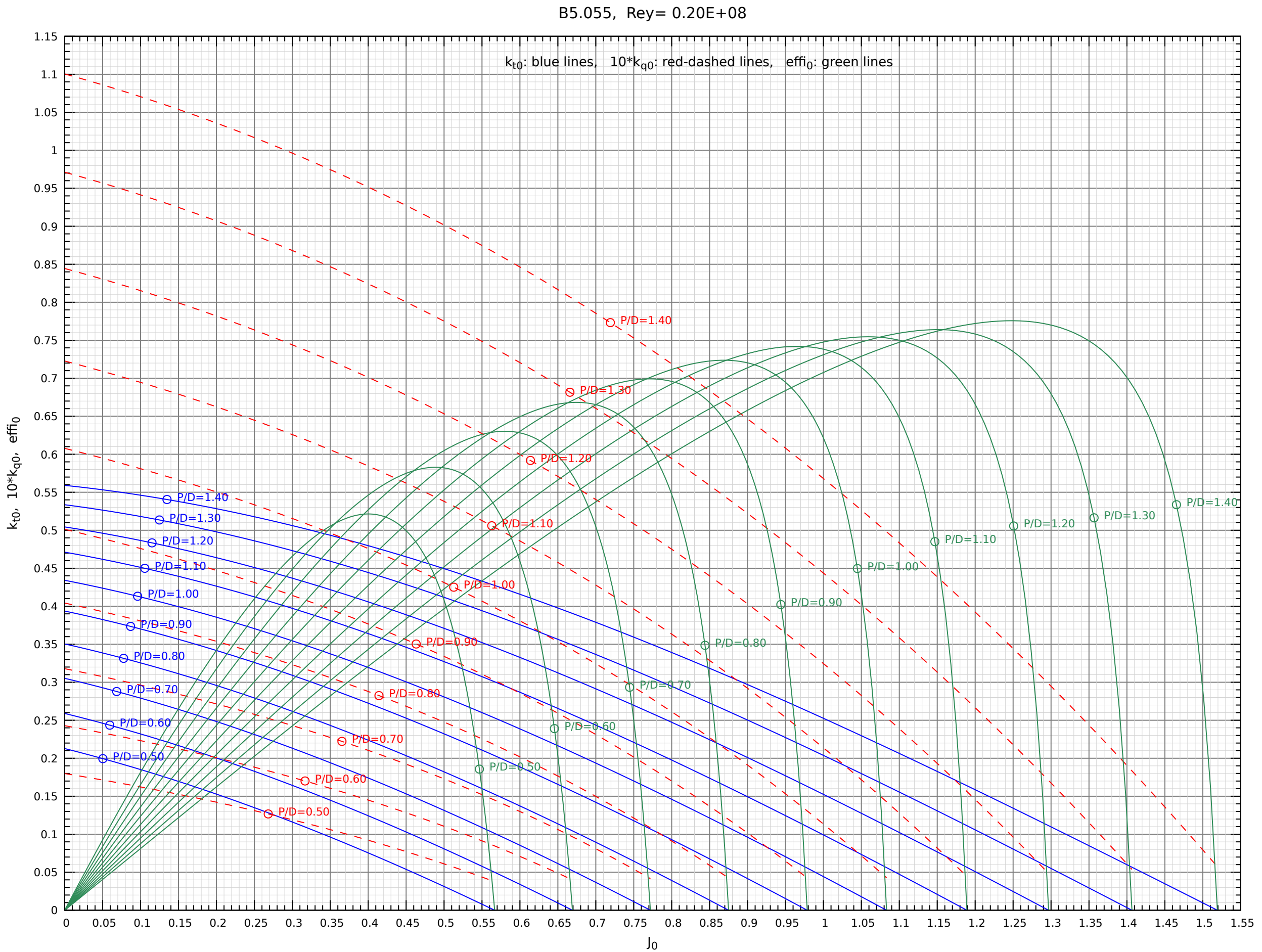
B5.055, Rey= 0.20E+08
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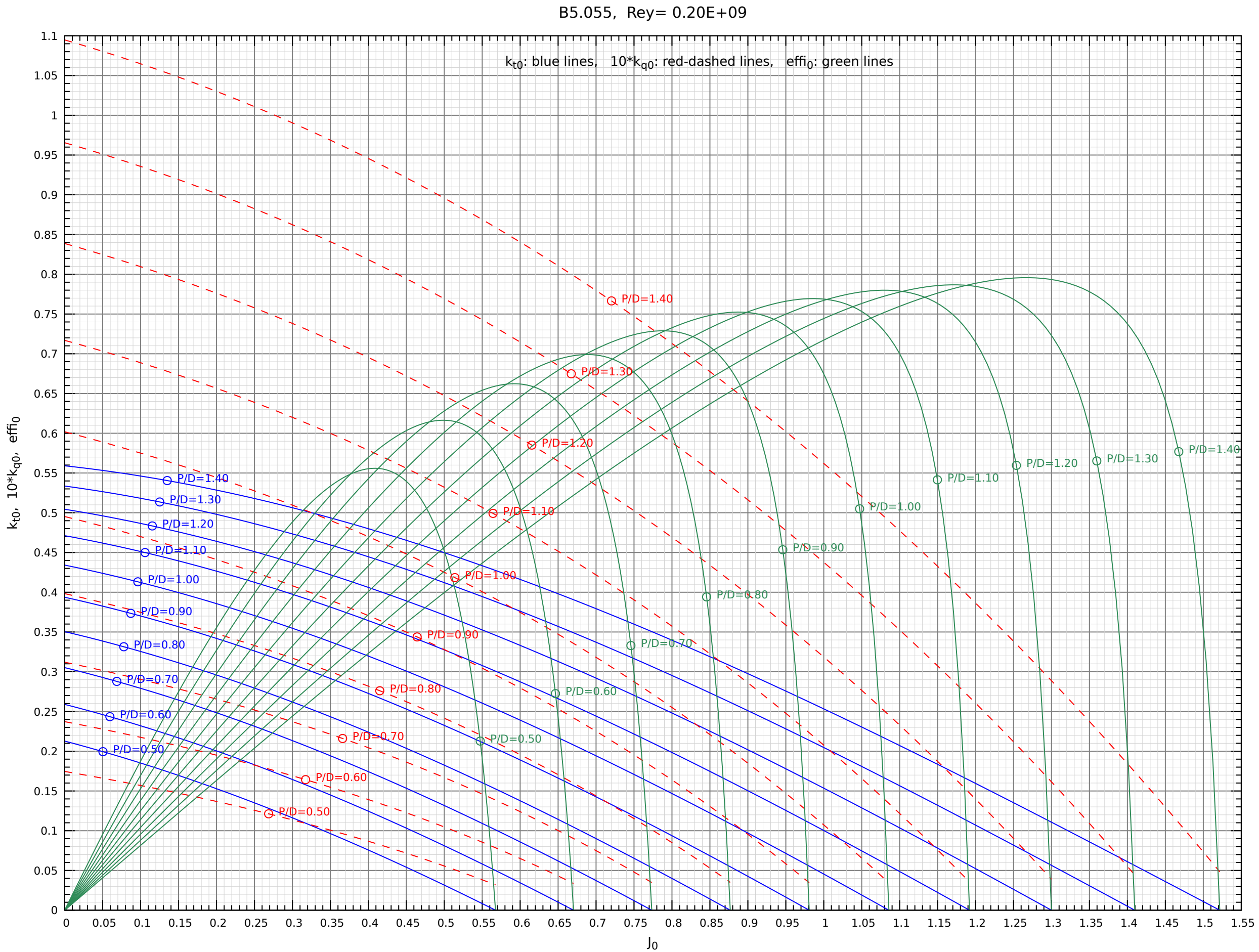
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k_{t0}, $10*k_{q0}$, $effi_0$
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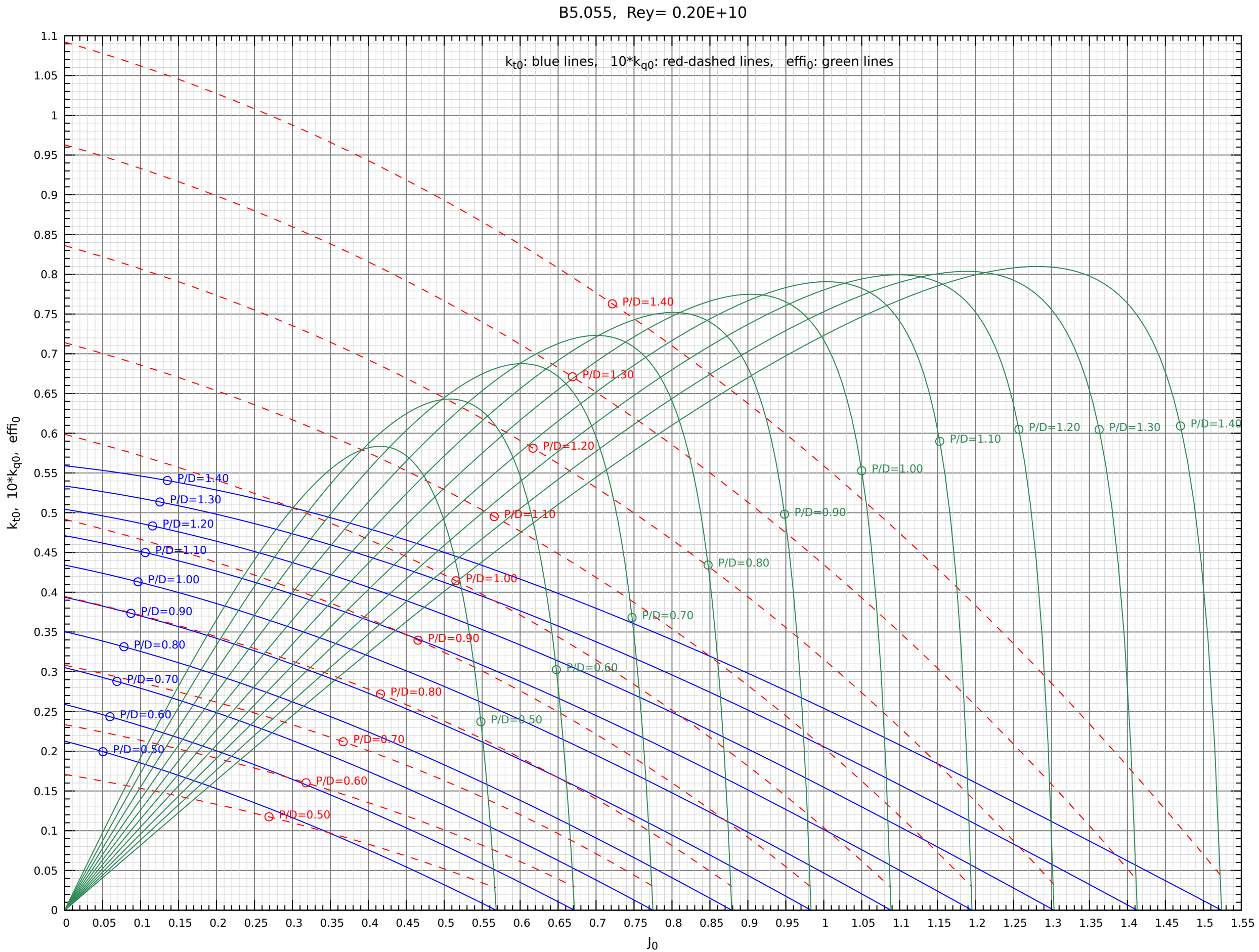
B5.055, Rey= 0.20E+10
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k_{t0}, $10*k_{q0}$, $effi_0$
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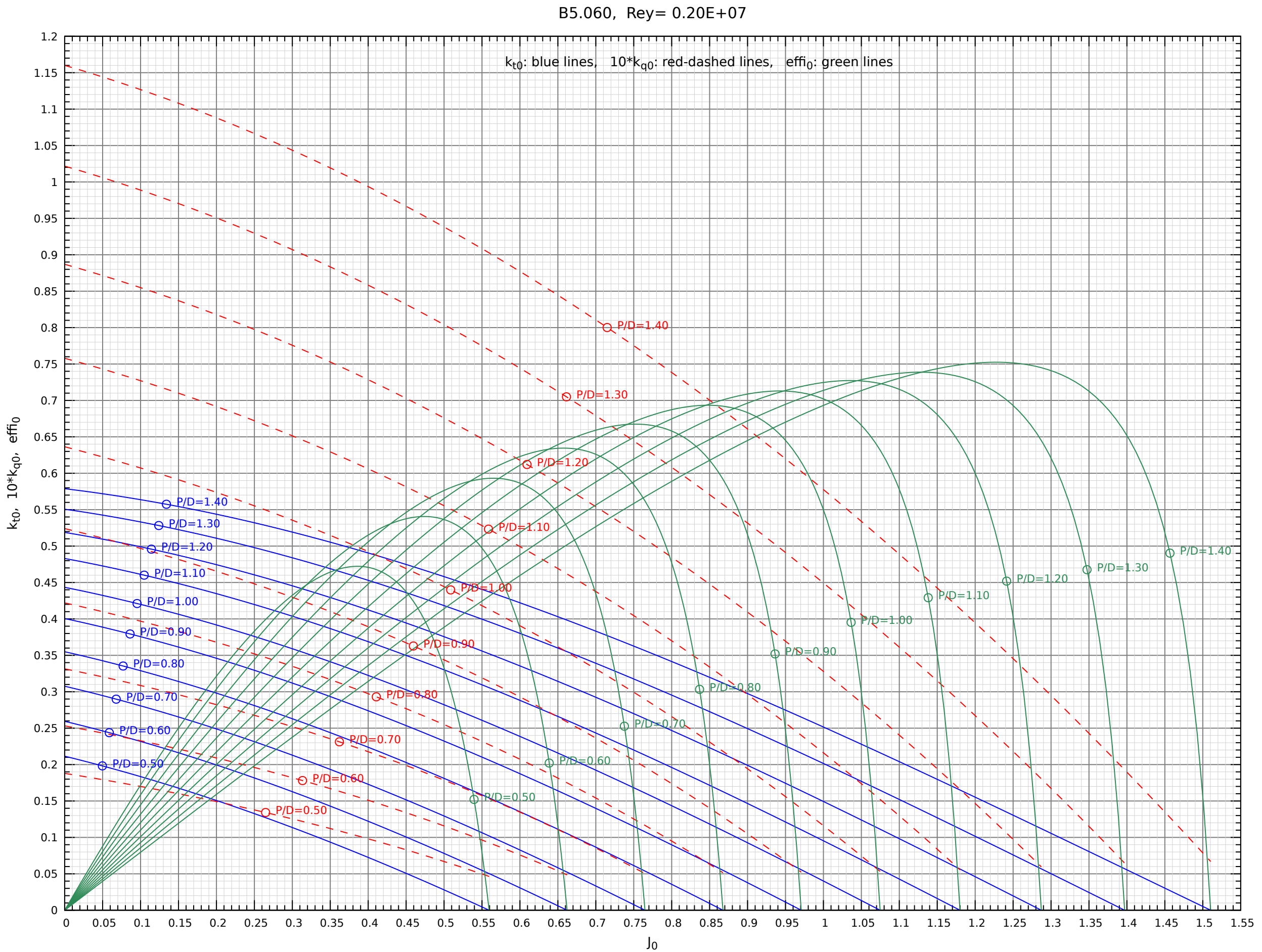
B5.060, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
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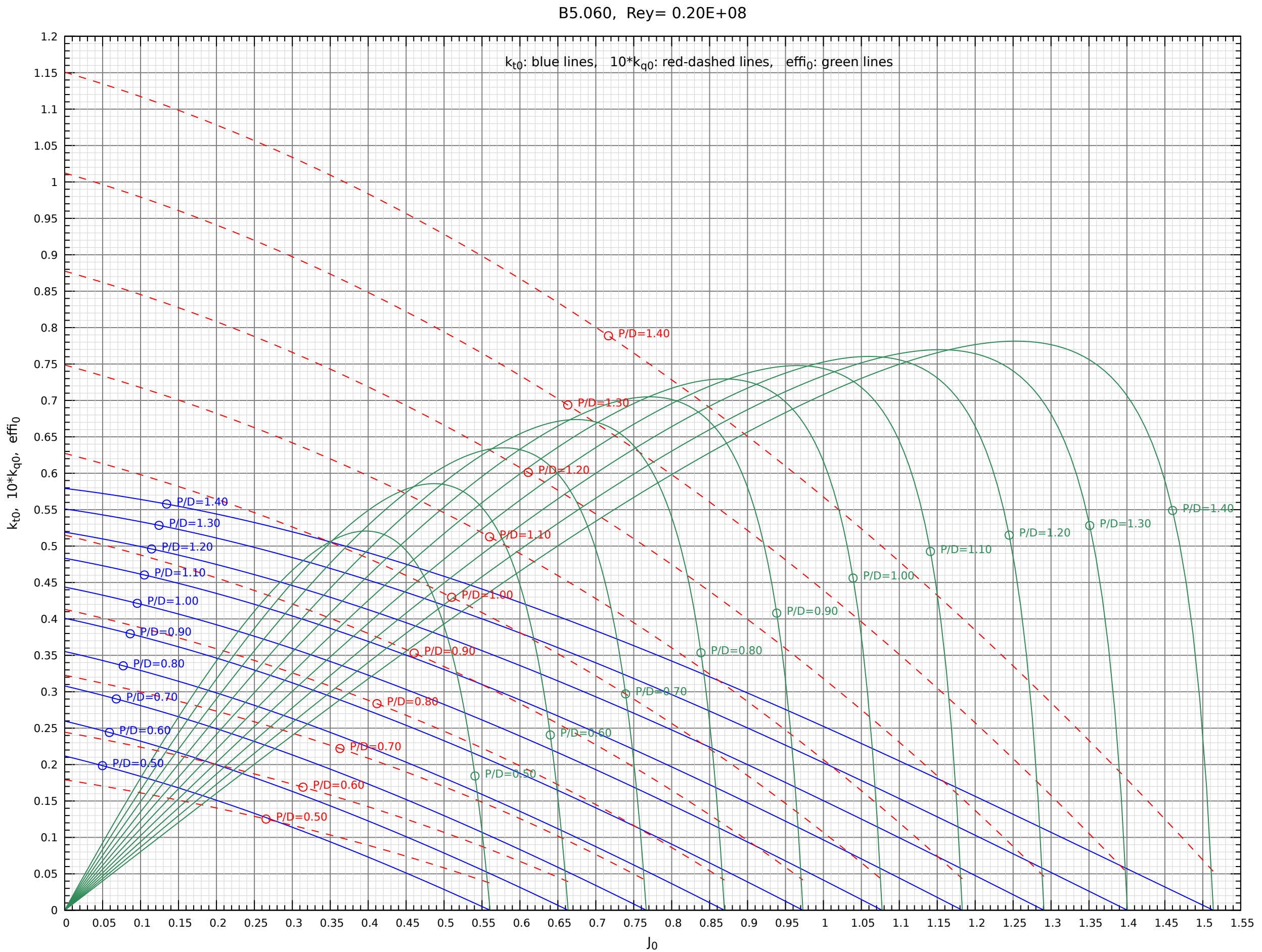
B5.060, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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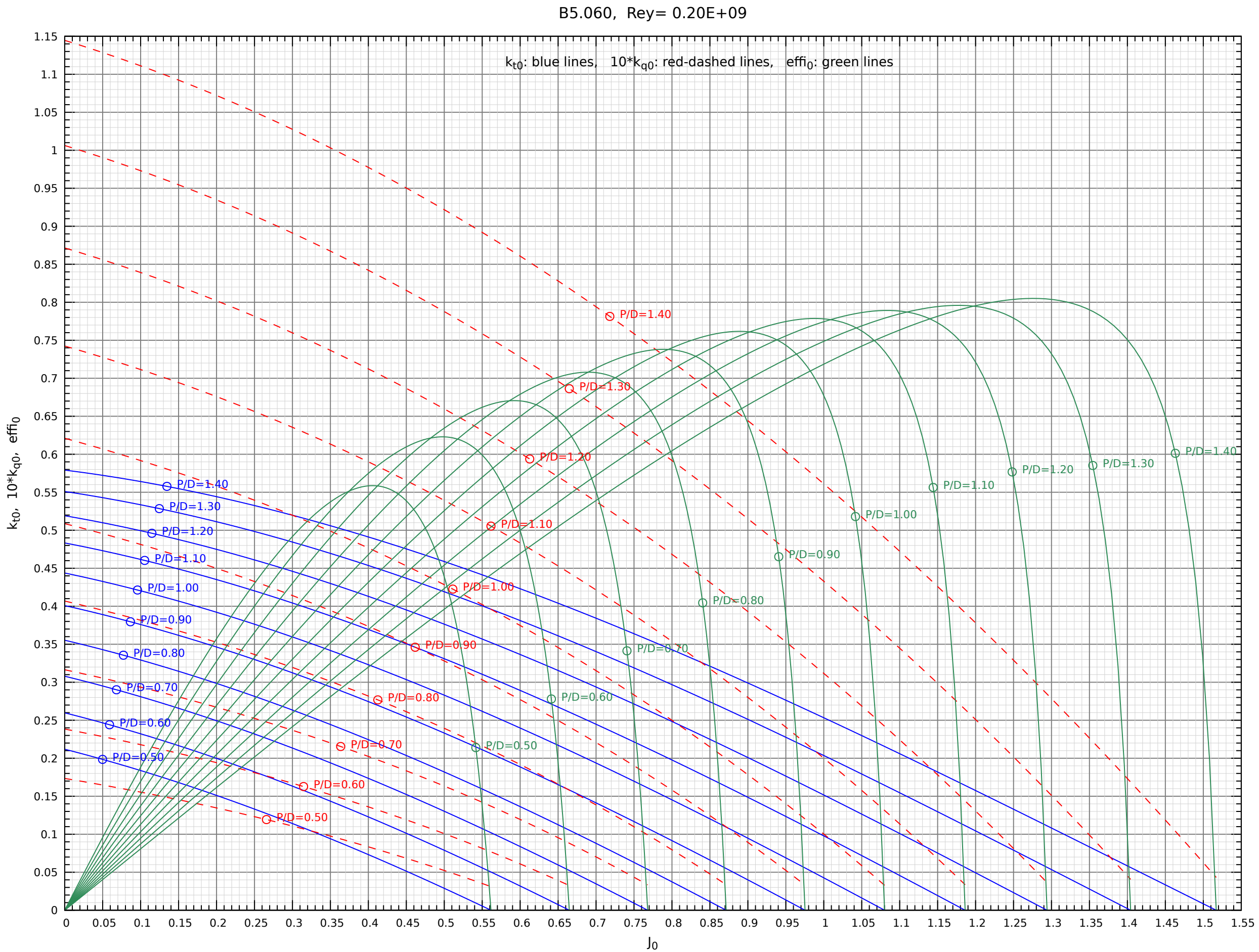
B5.060, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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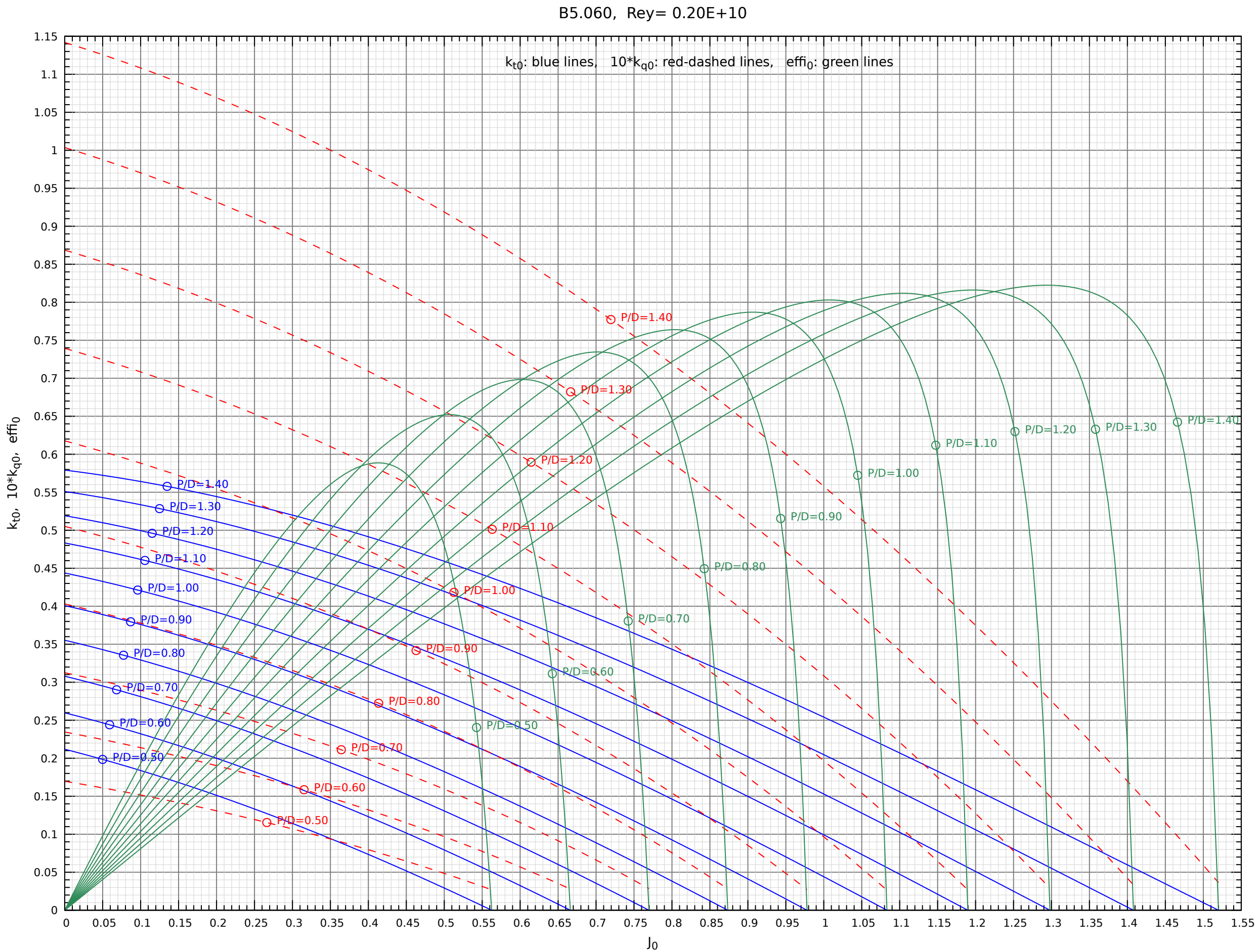
B5.060, Rey= 0.20E+10
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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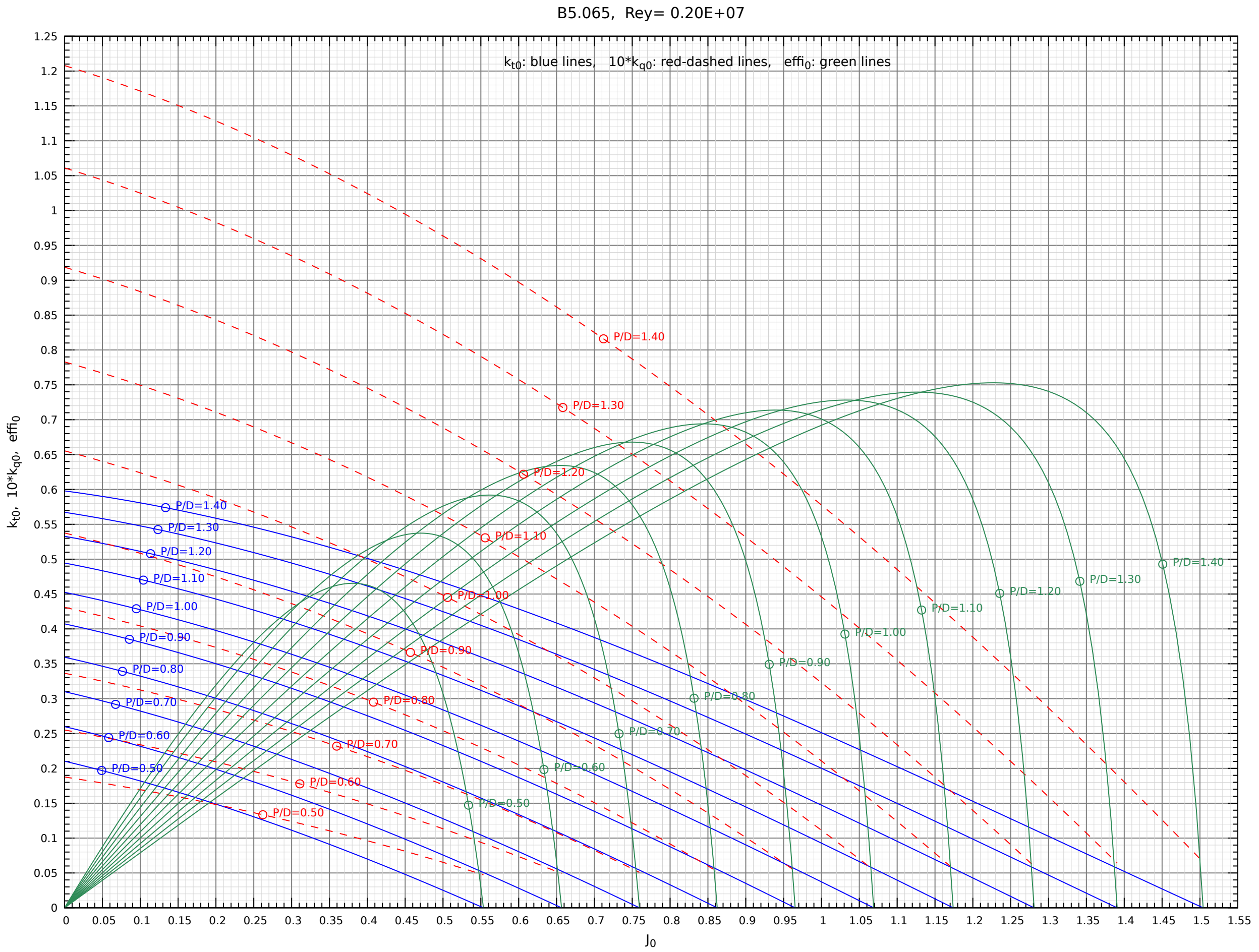
P/D=0.50


B5.065, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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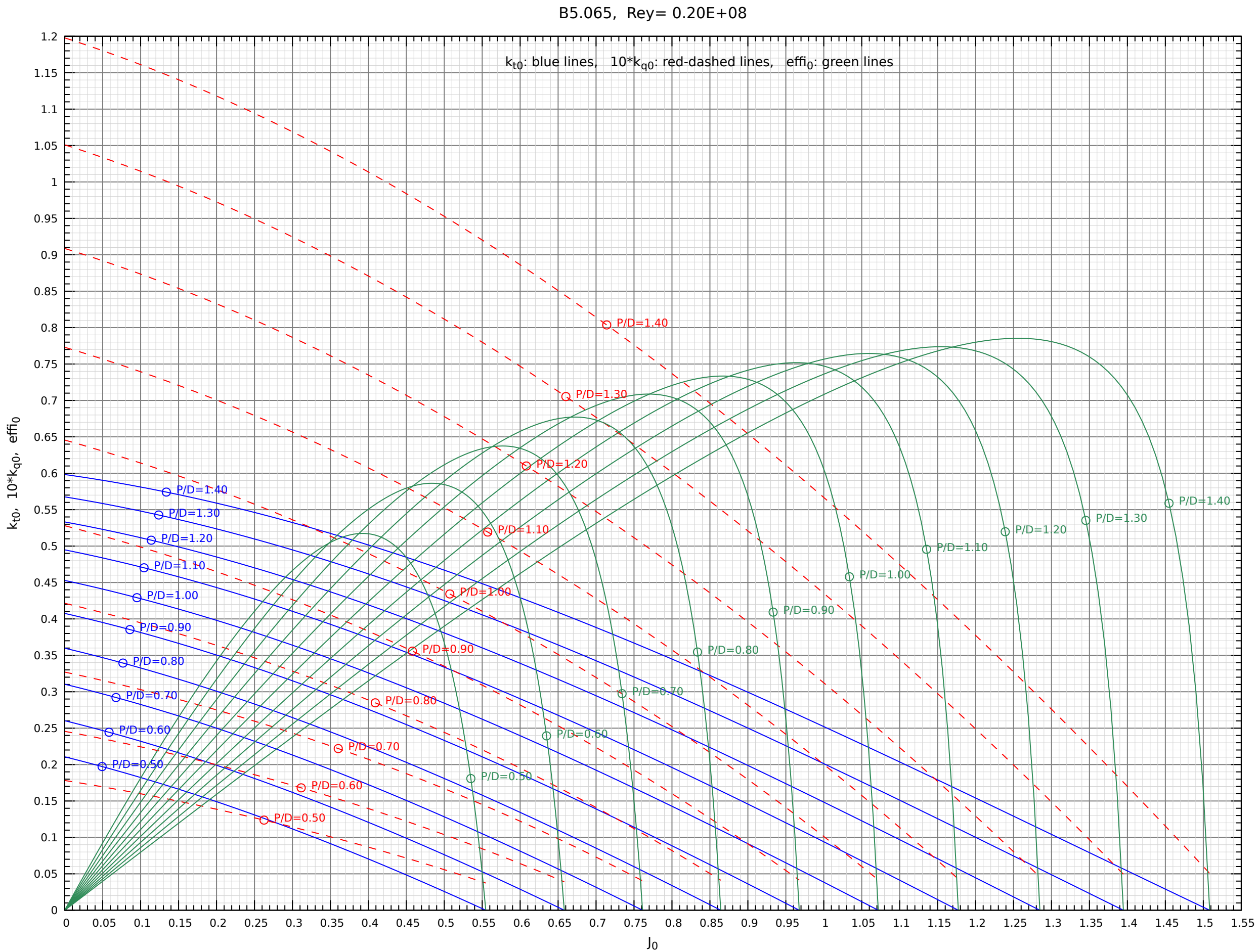
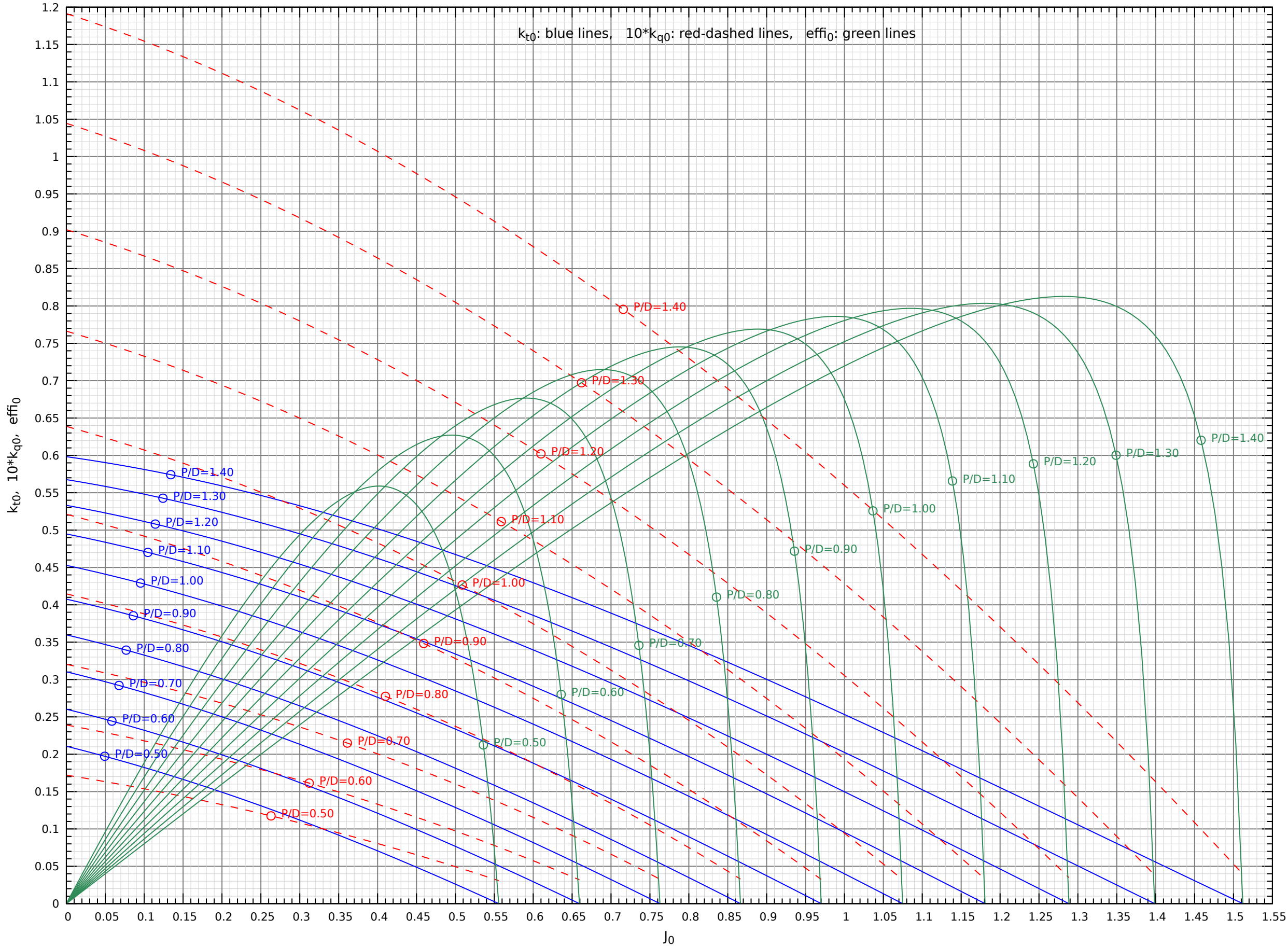
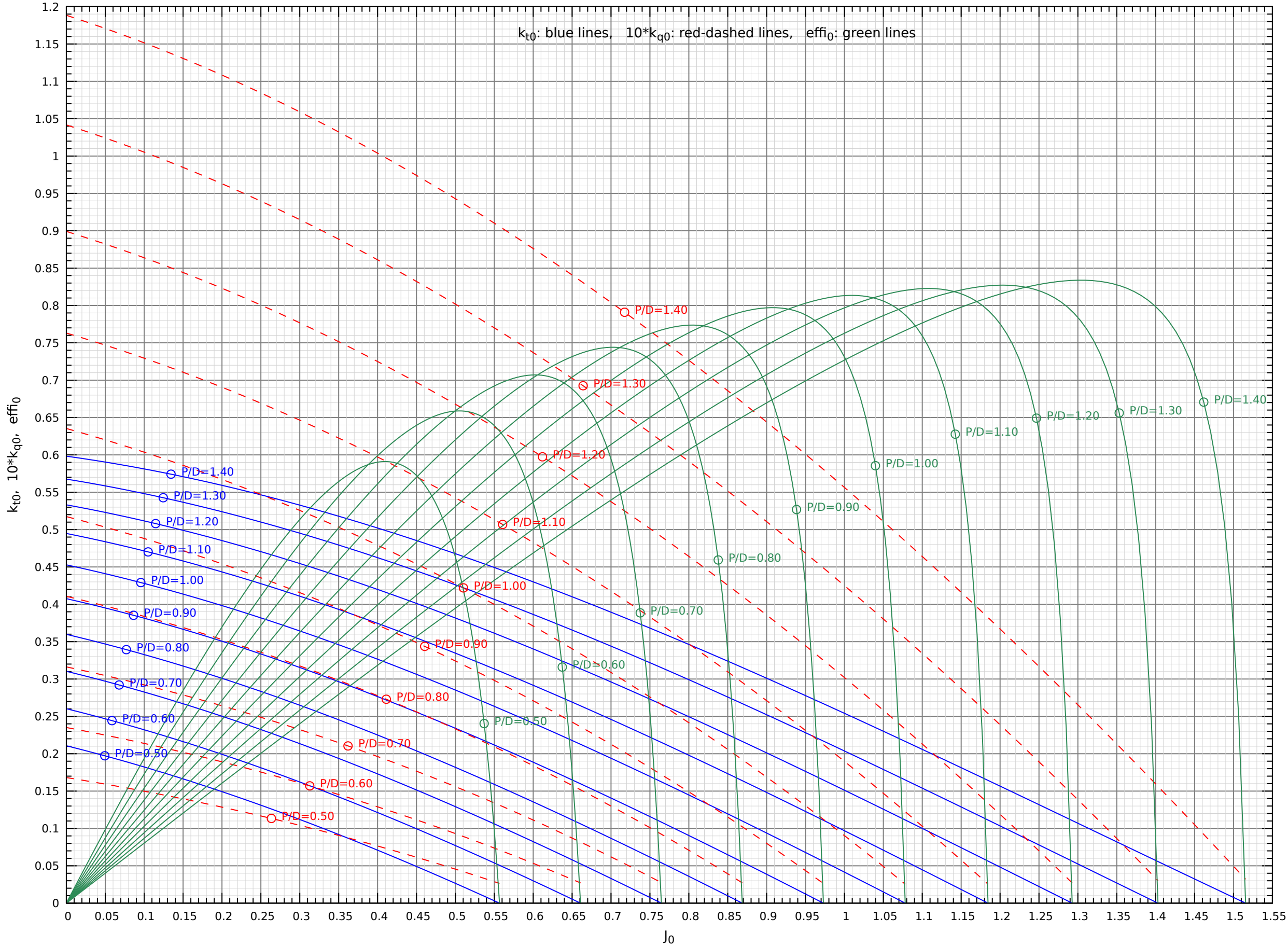
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

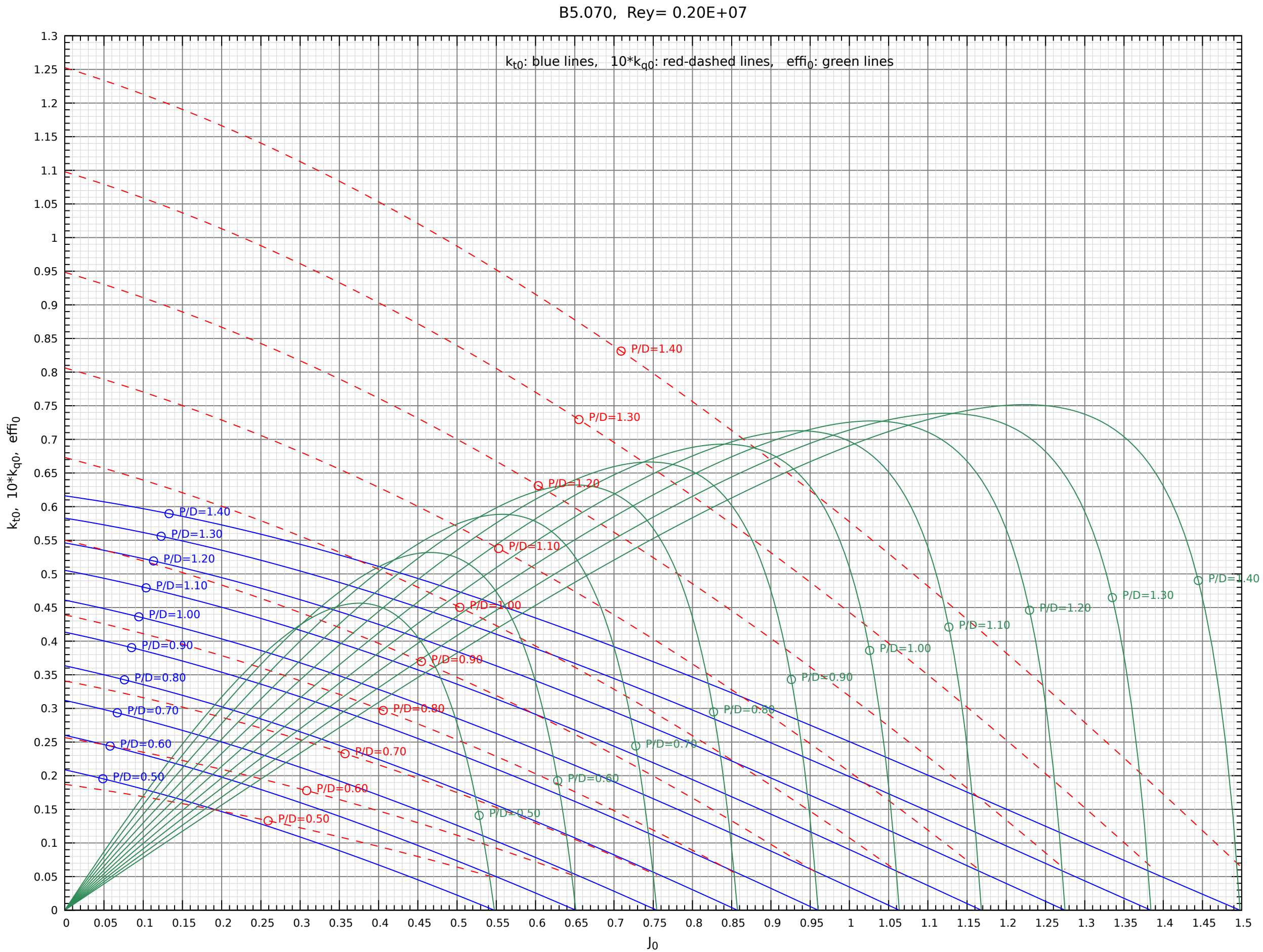

B5.065, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0

B5.065, Rey= 0.20E+09



B5.065, Rey= 0.20E+10




B5.070, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
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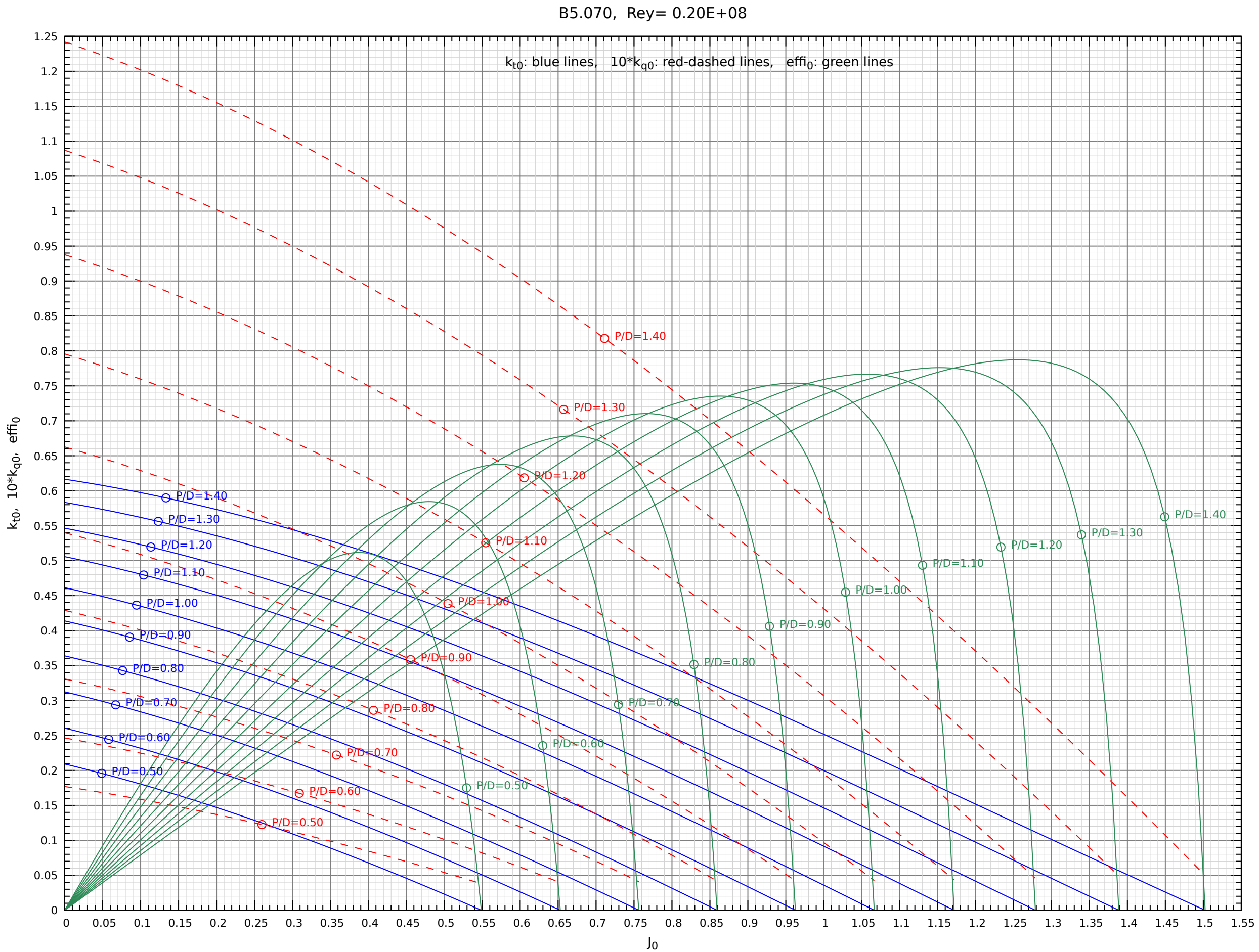
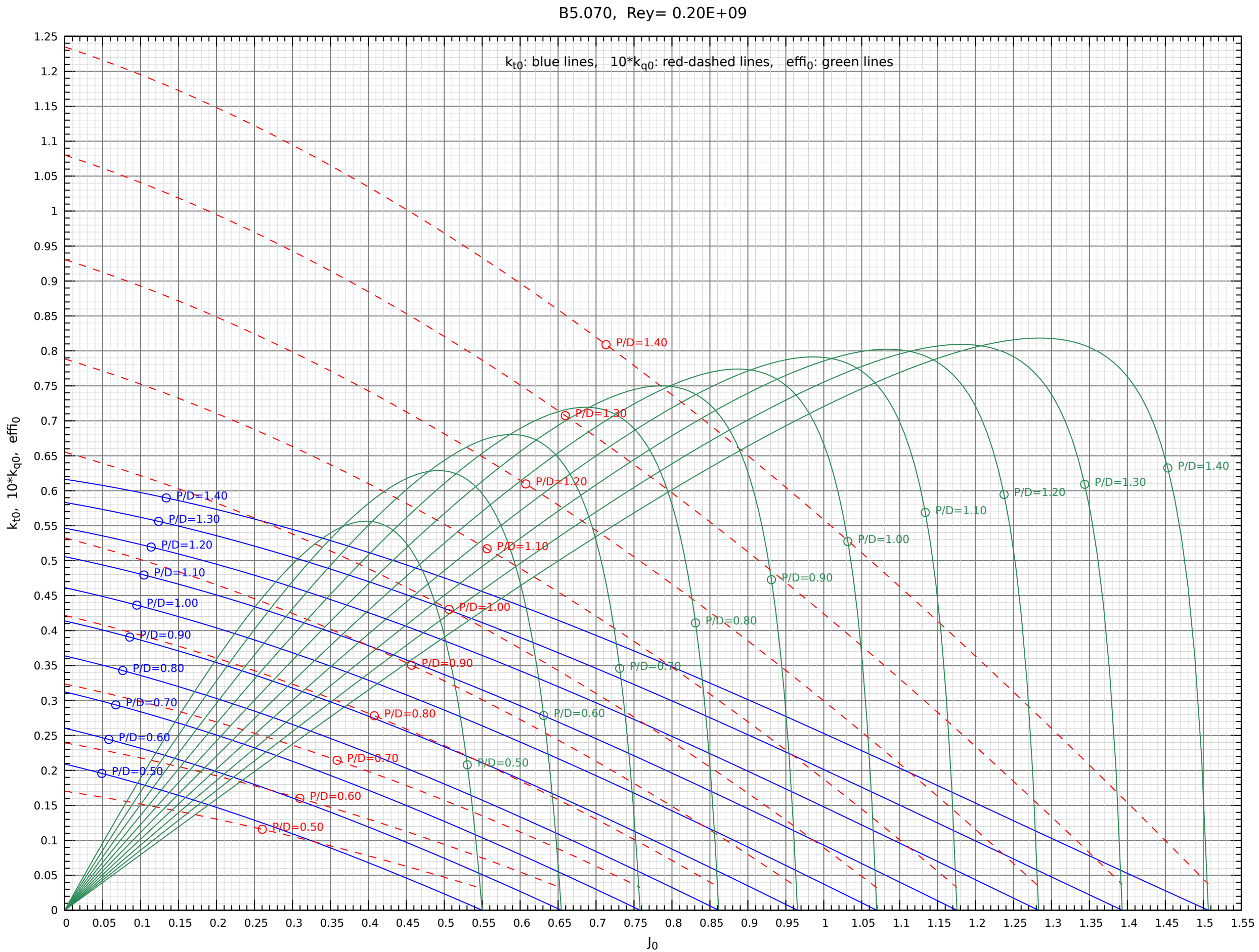
P/D=0.50


B5.070, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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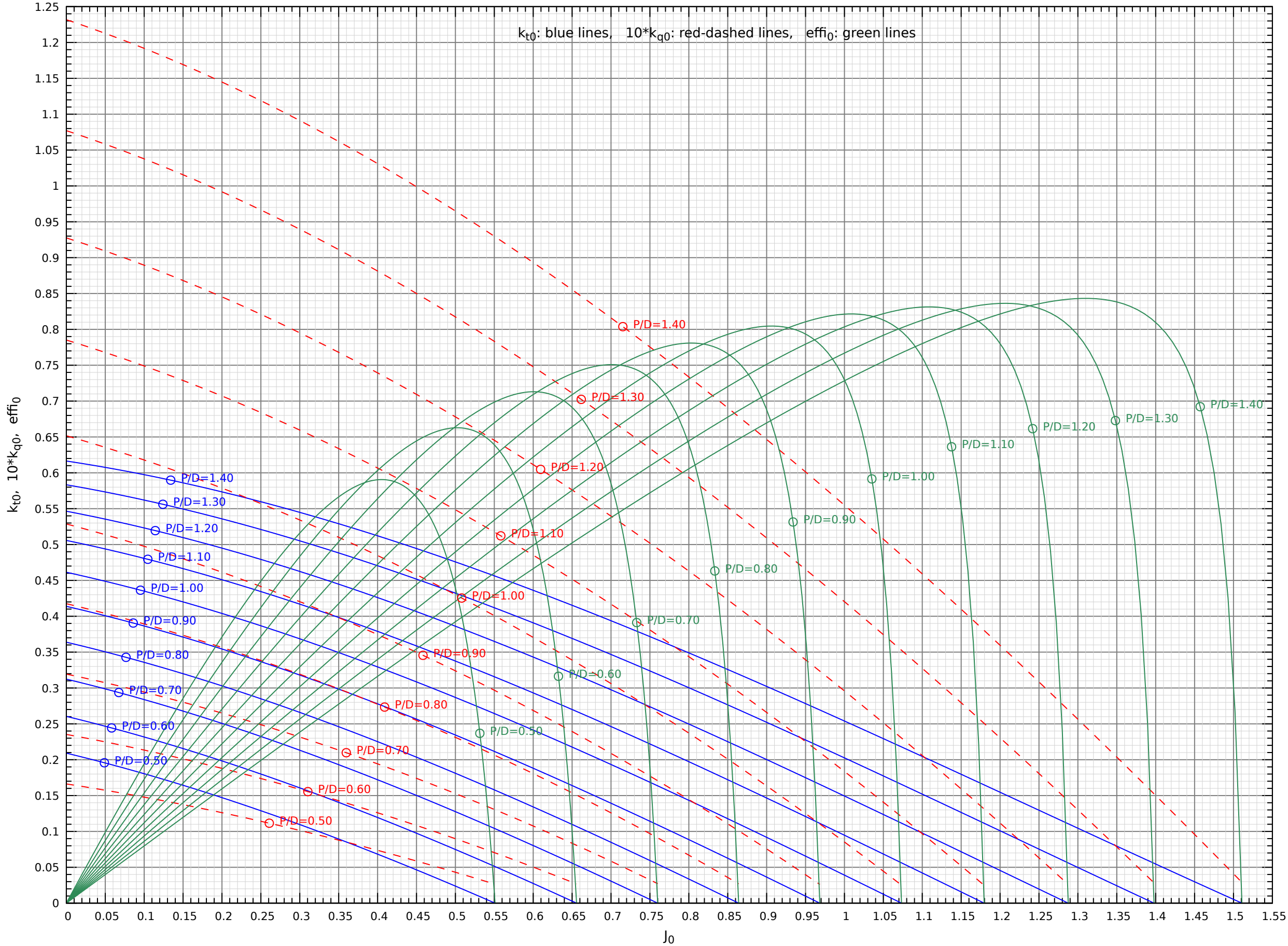
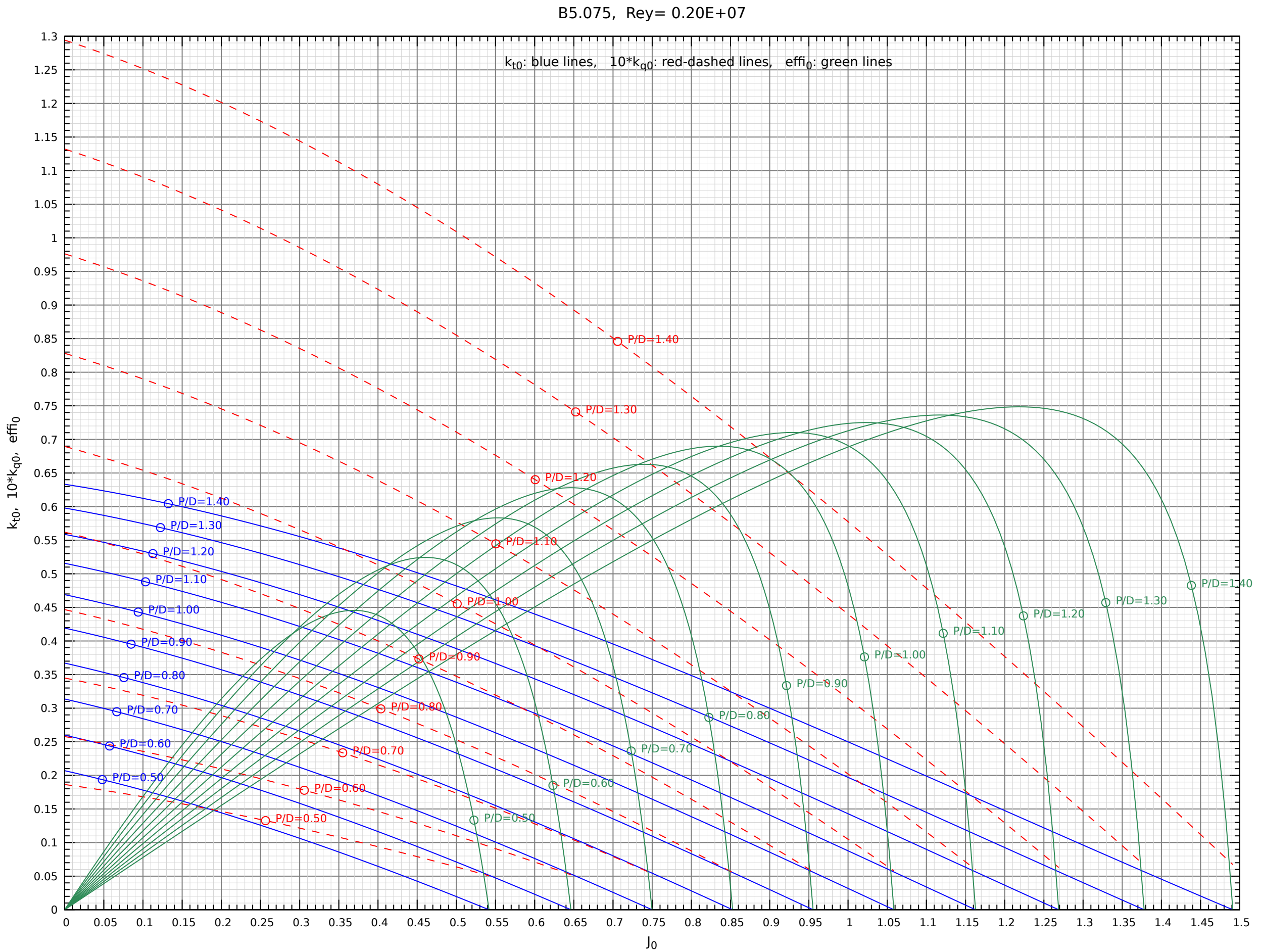
P/D=0.70
P/D=0.60
P/D=0.50

B5.070, Rey= 0.20E+10

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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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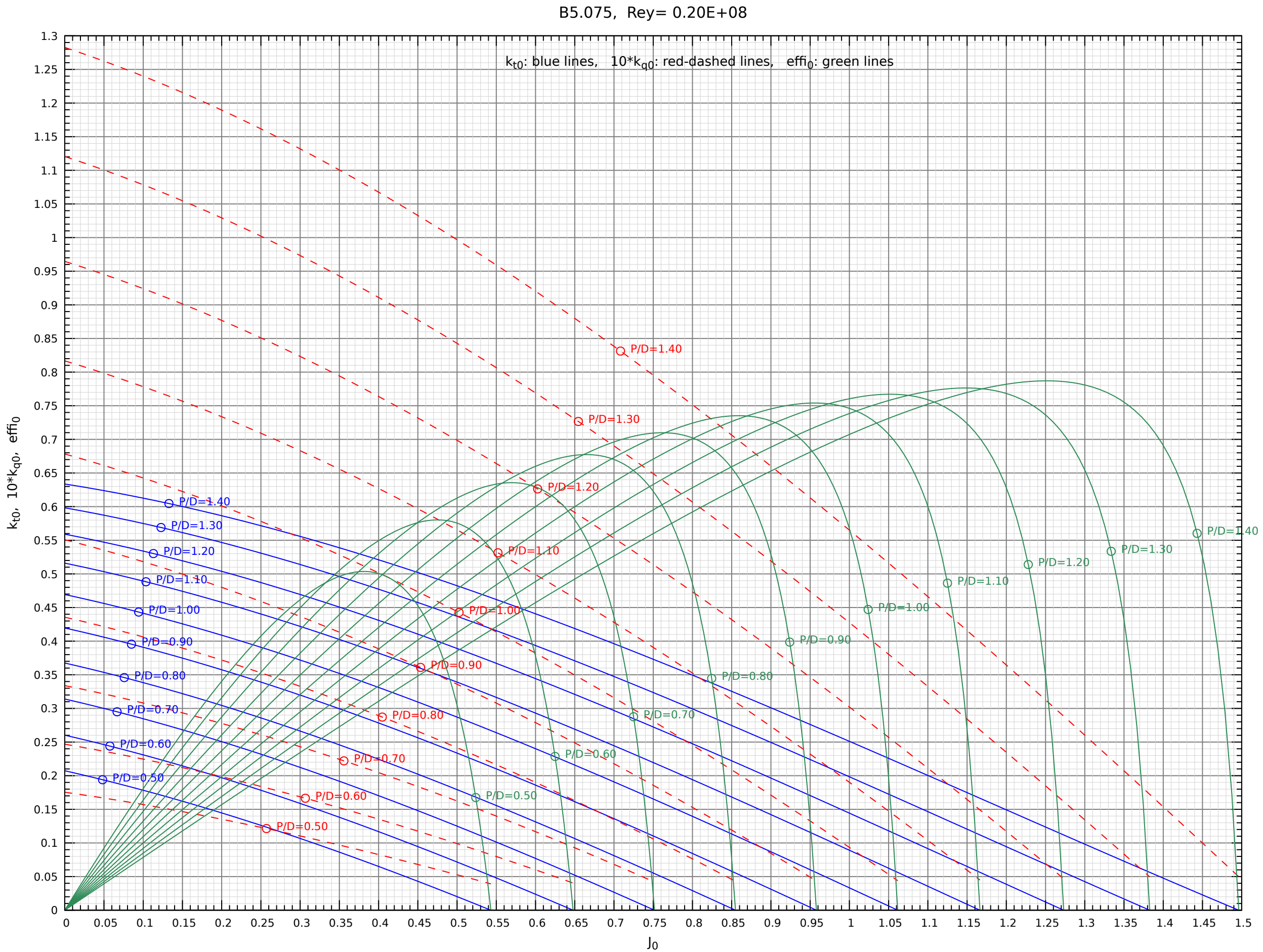
P/D=0.50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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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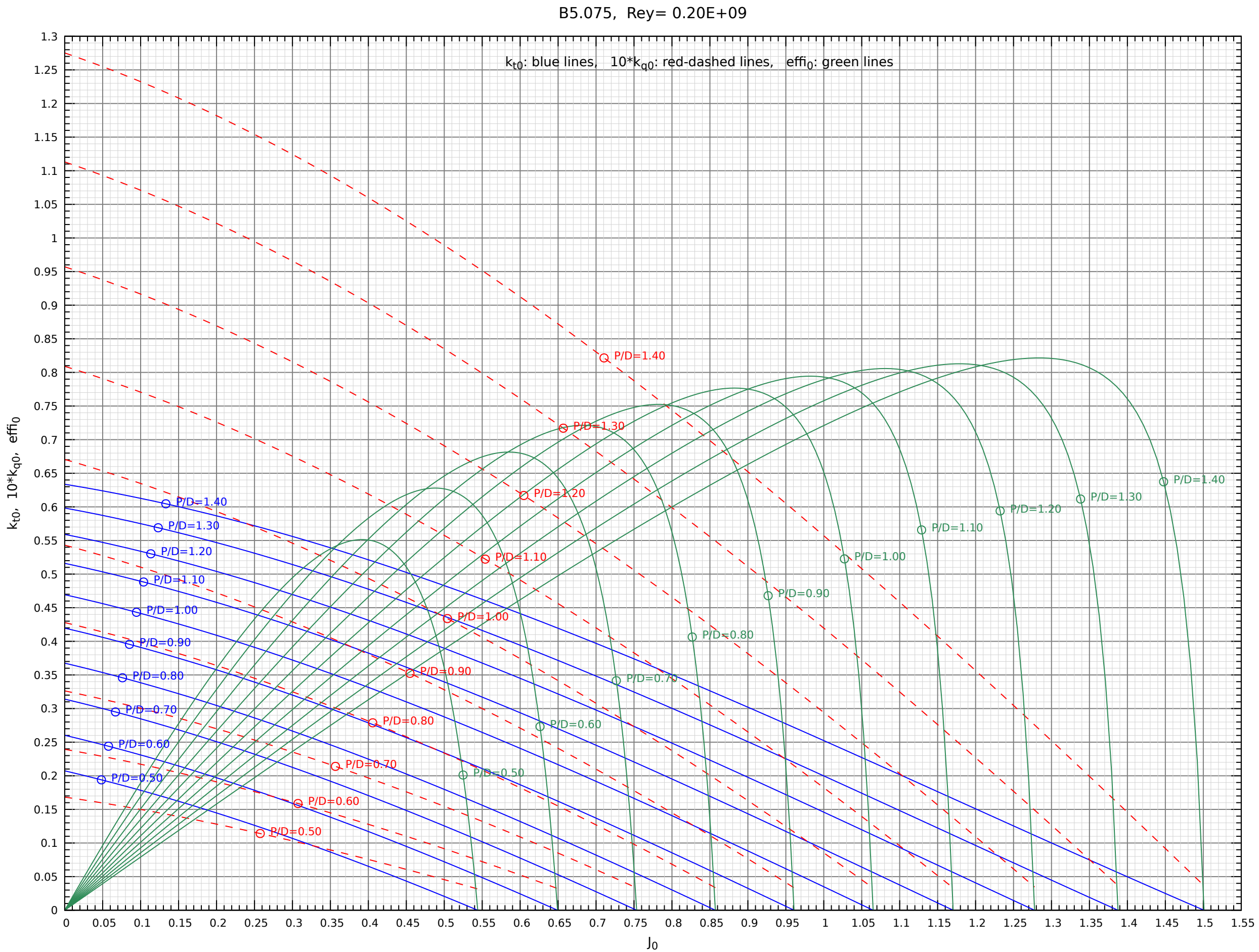
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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P/D=1.20
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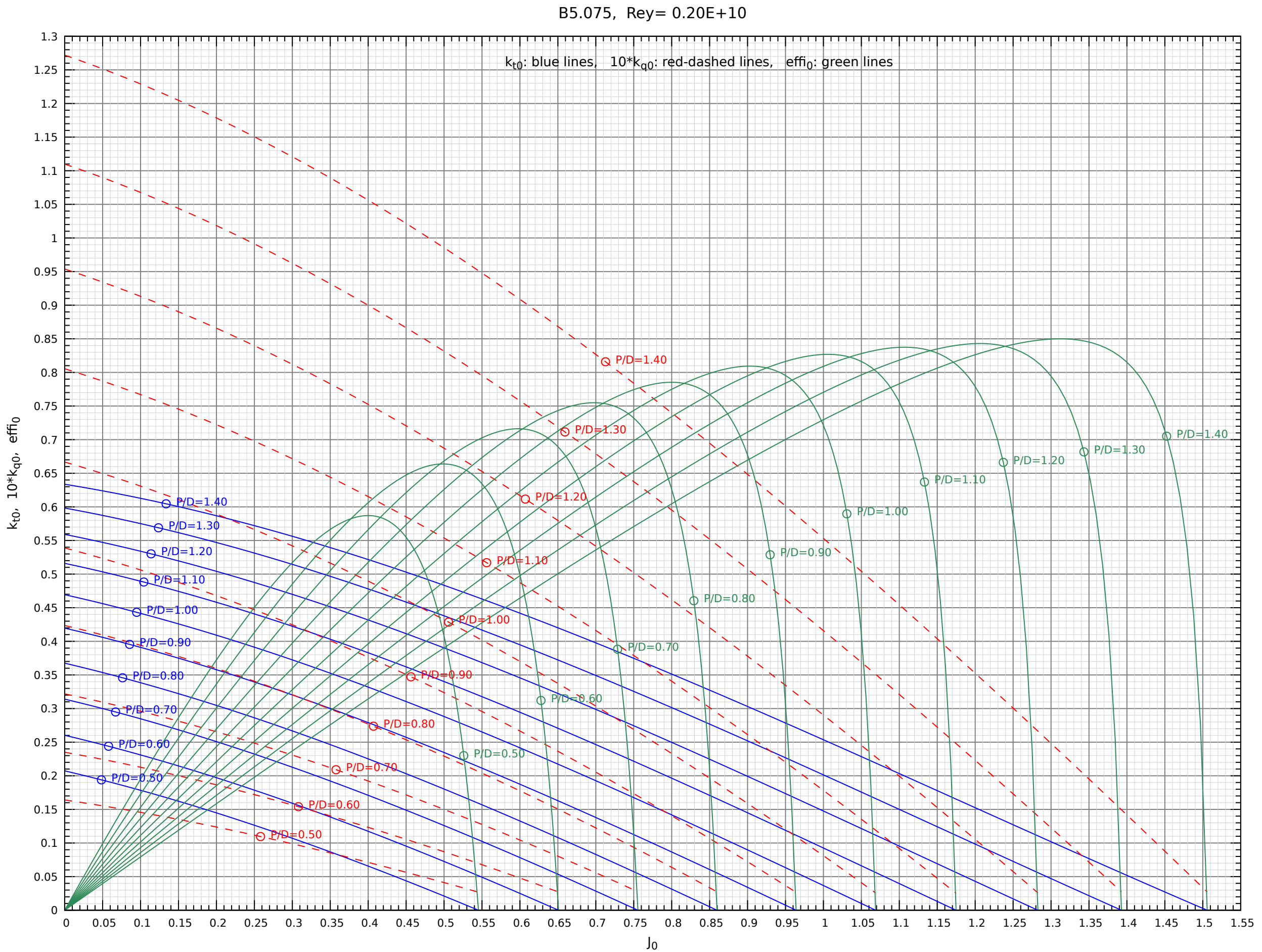
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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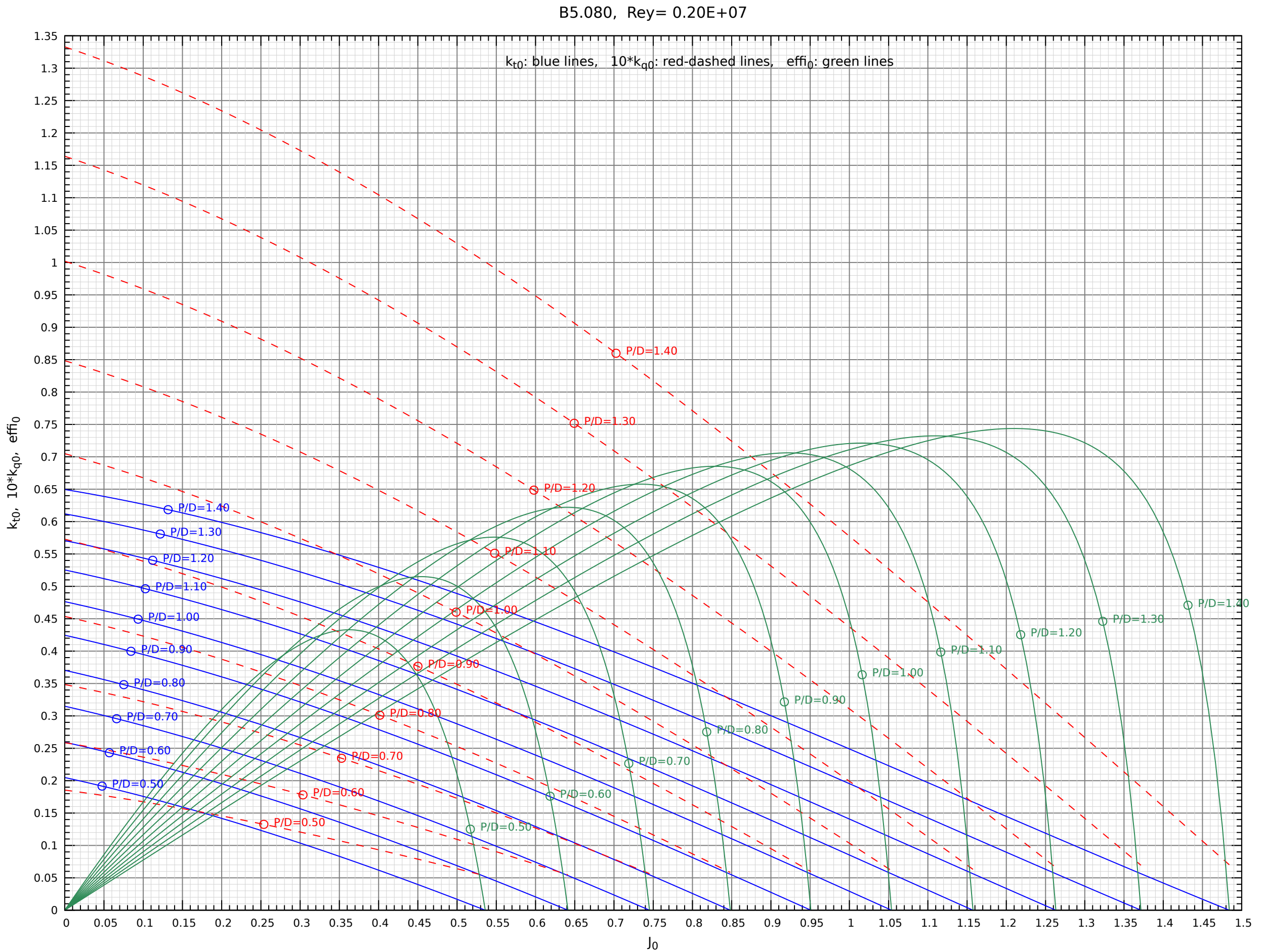
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k_{t0}, $10*k_{q0}$, $effi_0$
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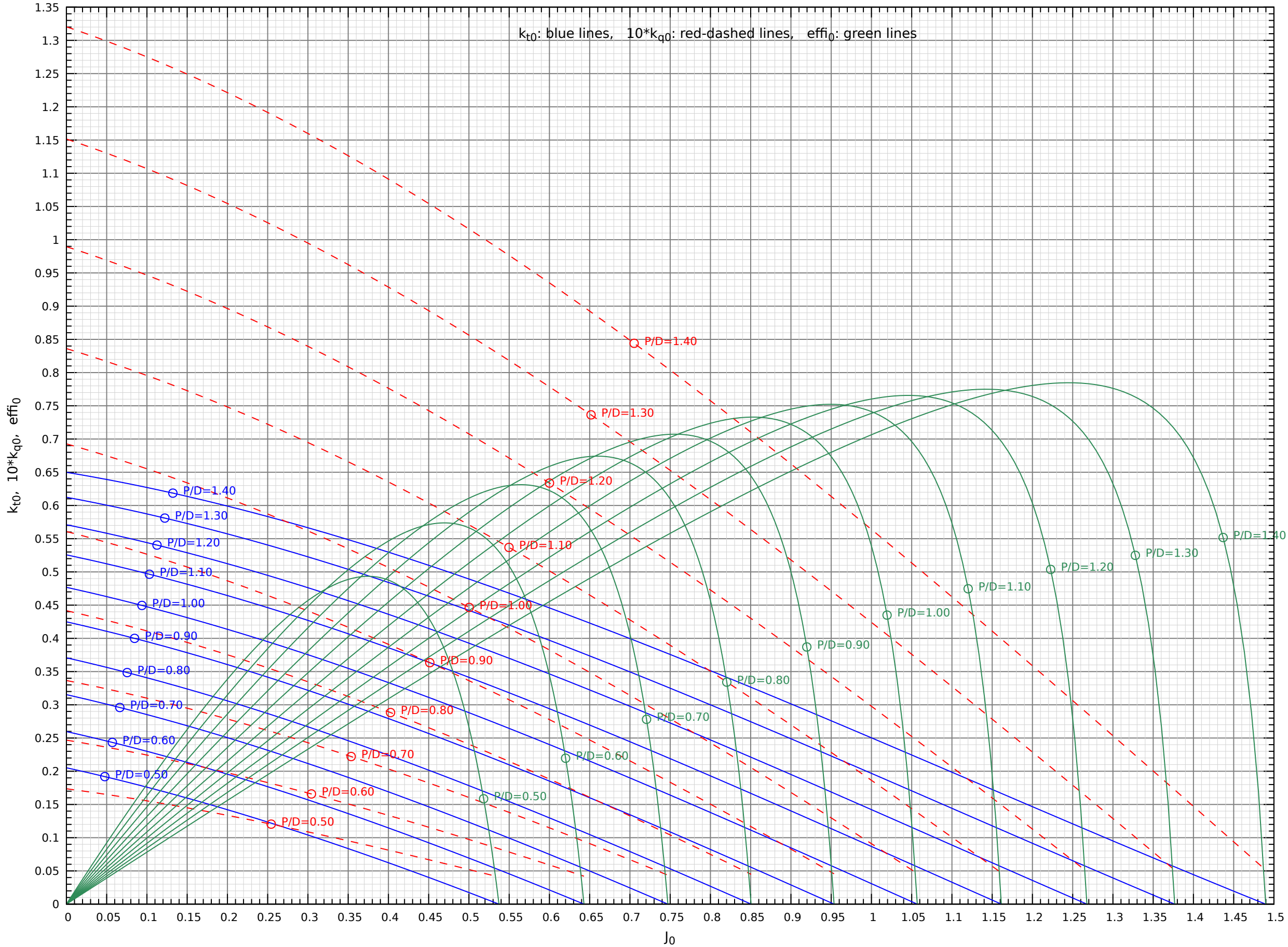
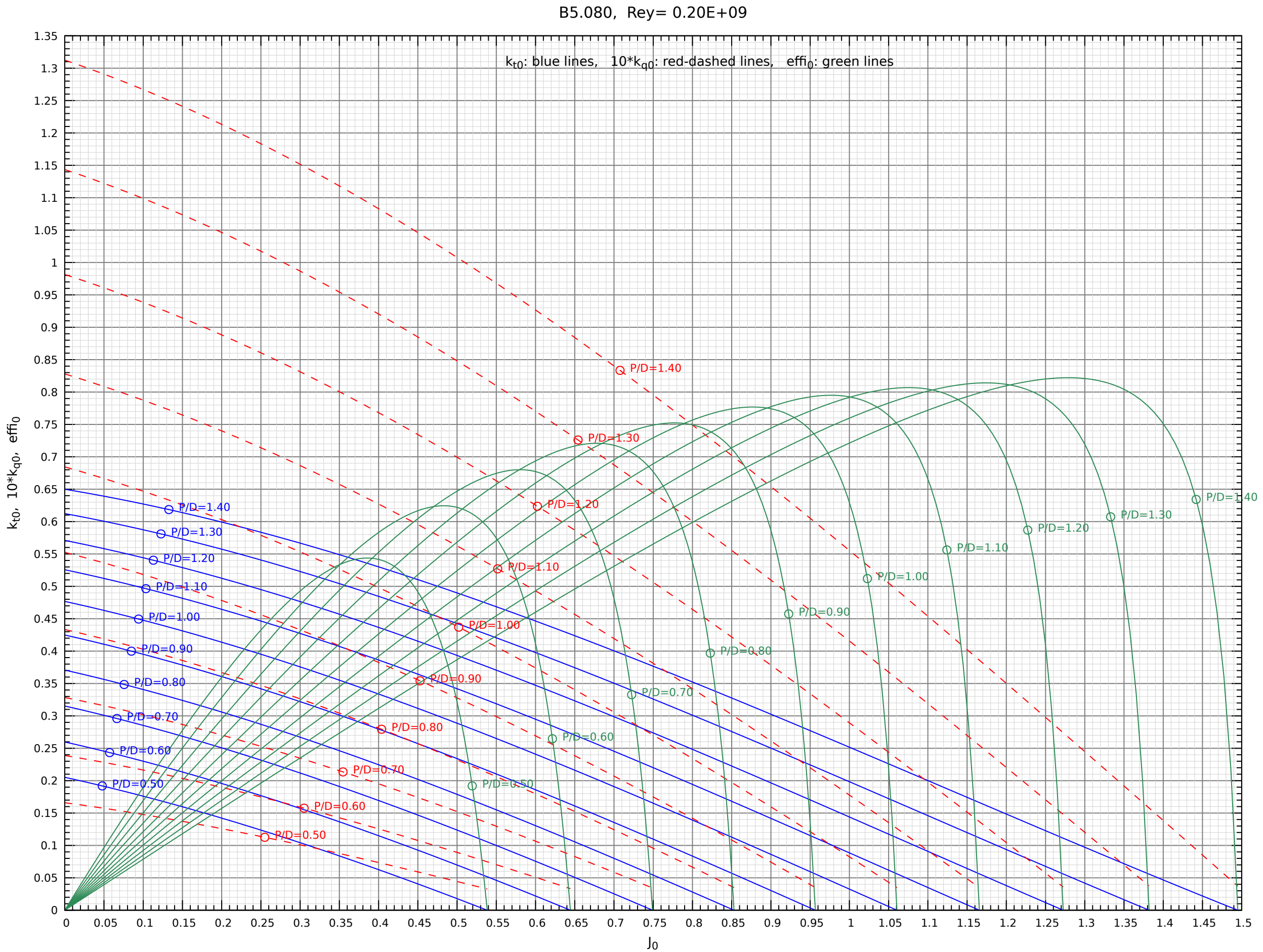
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B5.080, Rey= 0.20E+08

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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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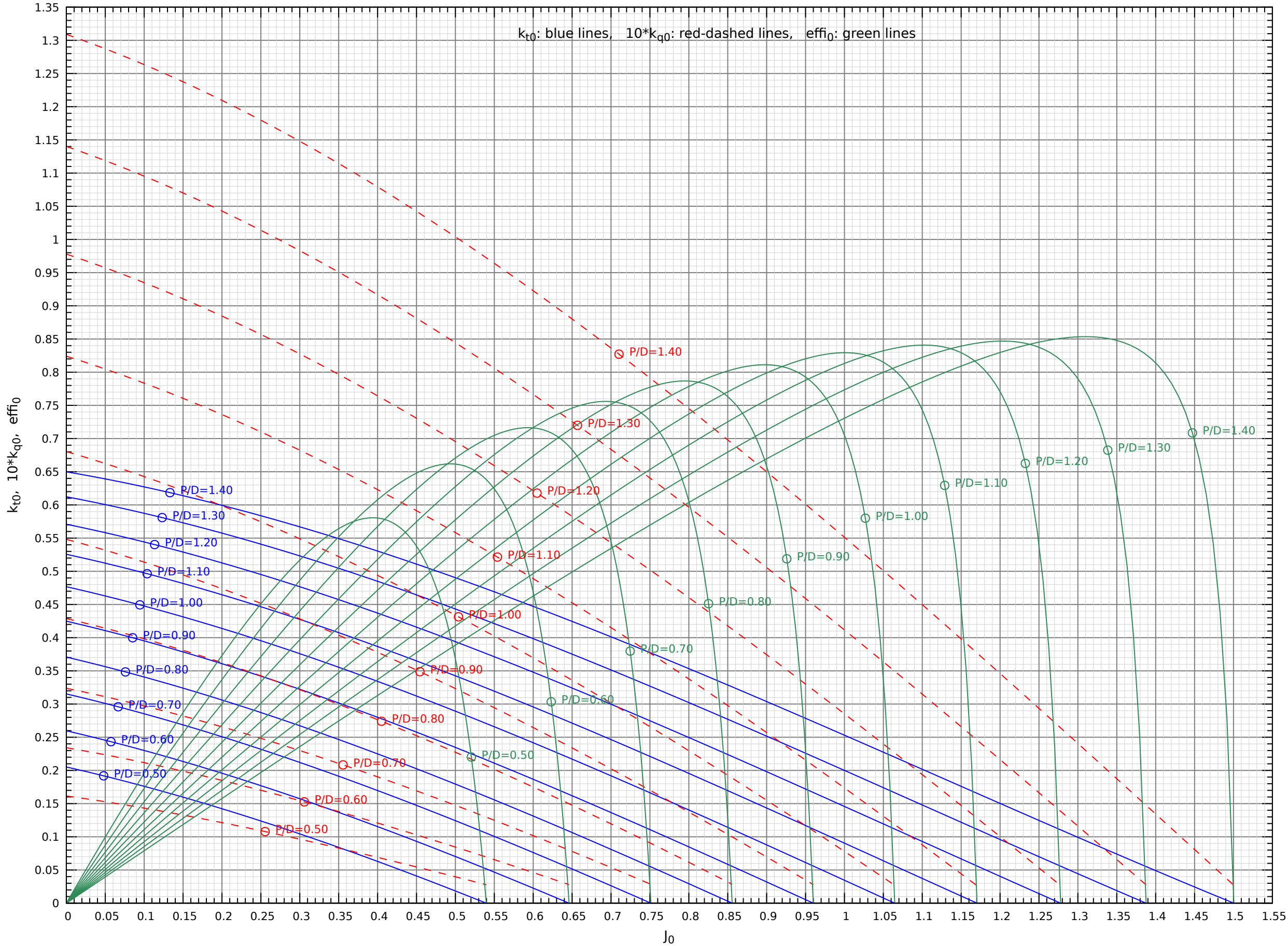
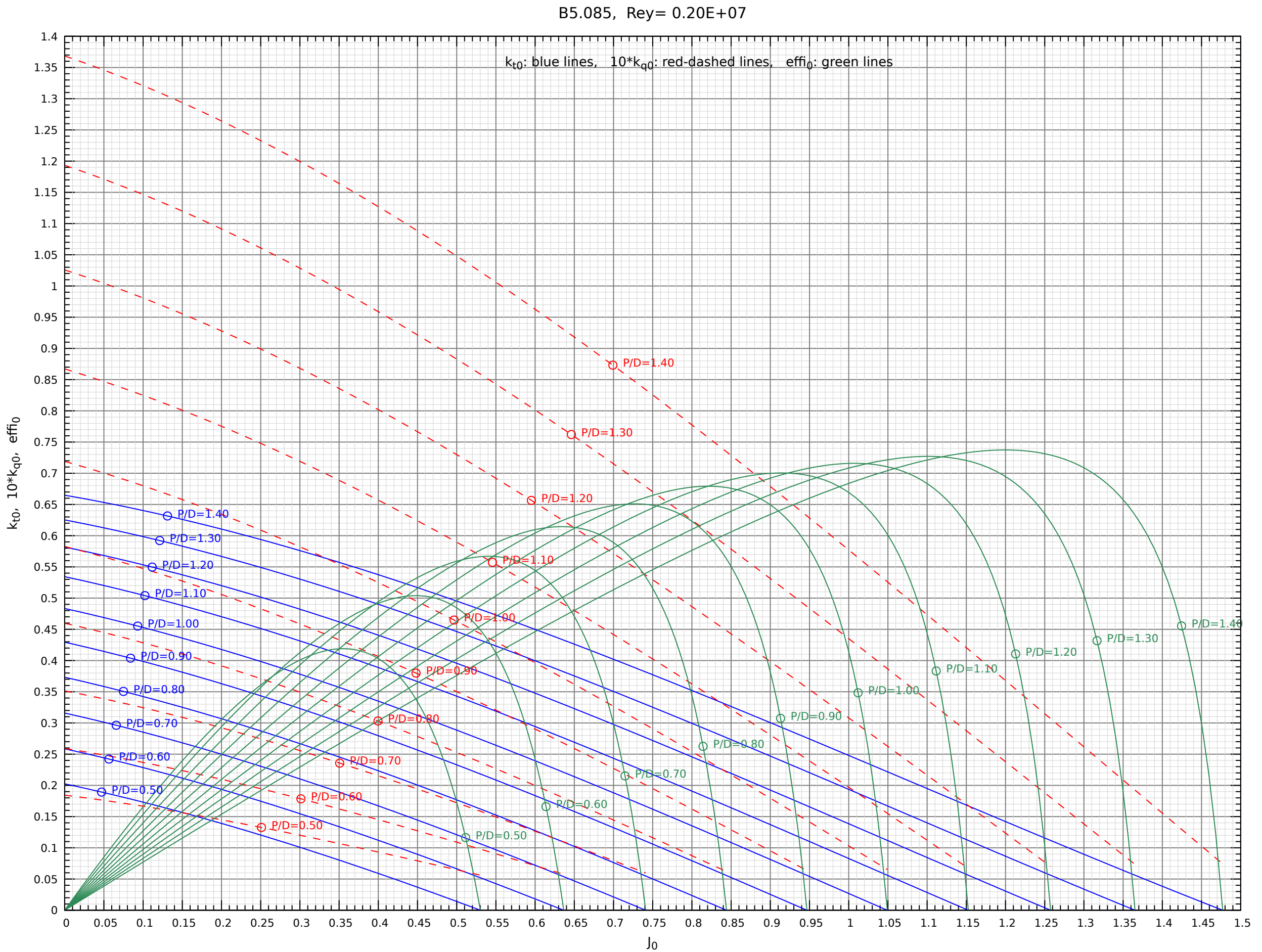
P/D=0.70
P/D=0.60
P/D=0.50

B5.080, Rey= 0.20E+10

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P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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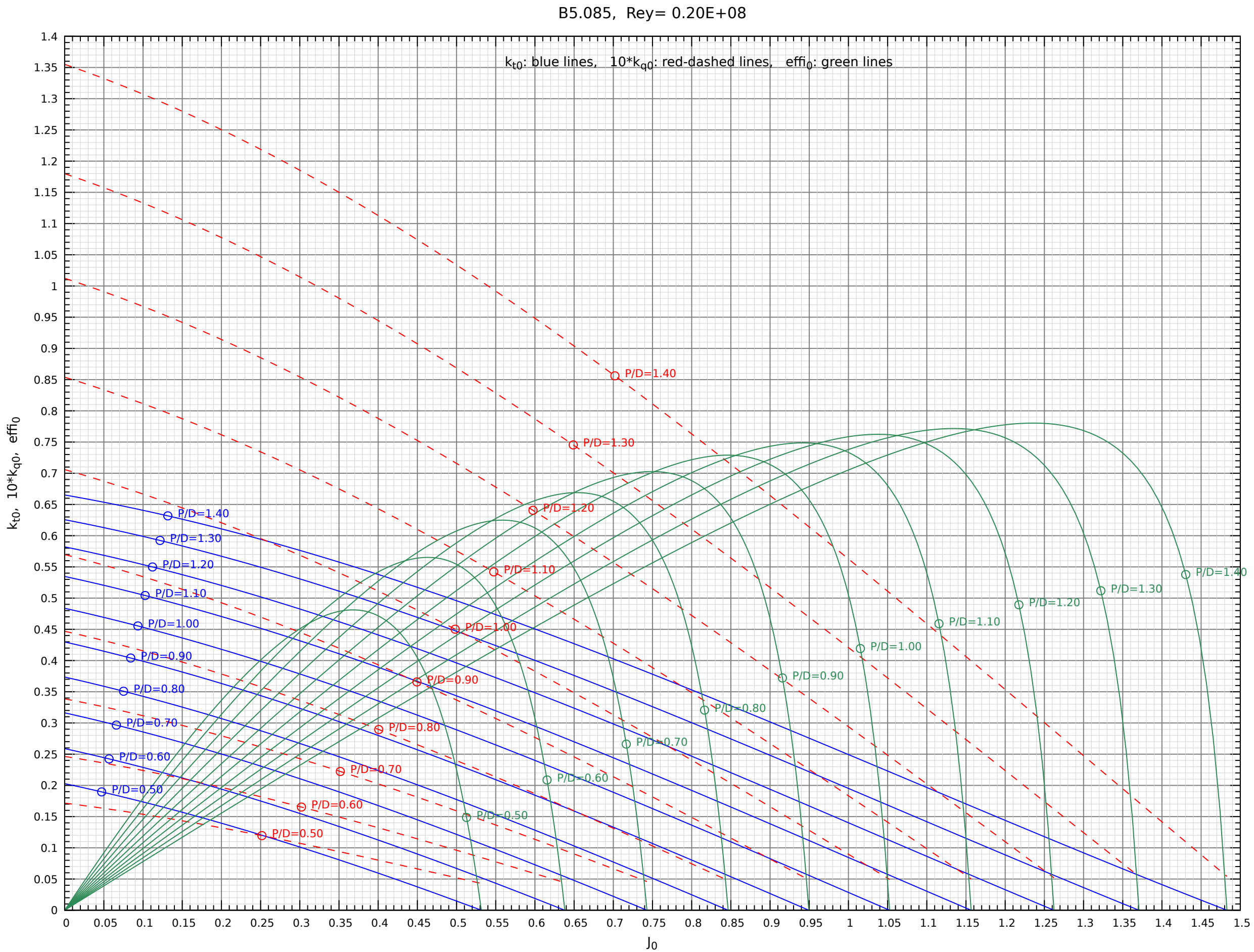
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.30
P/D=1.20
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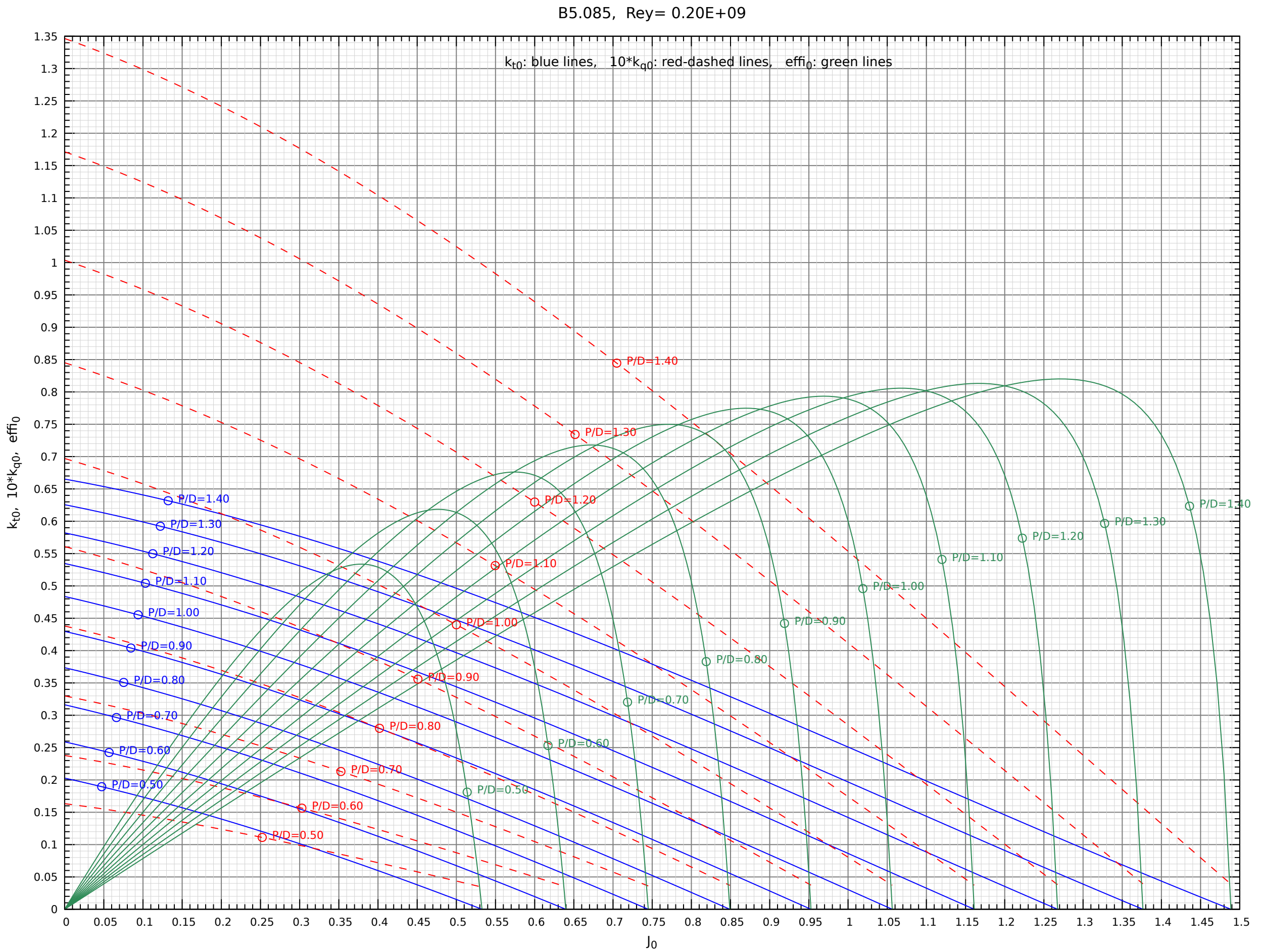
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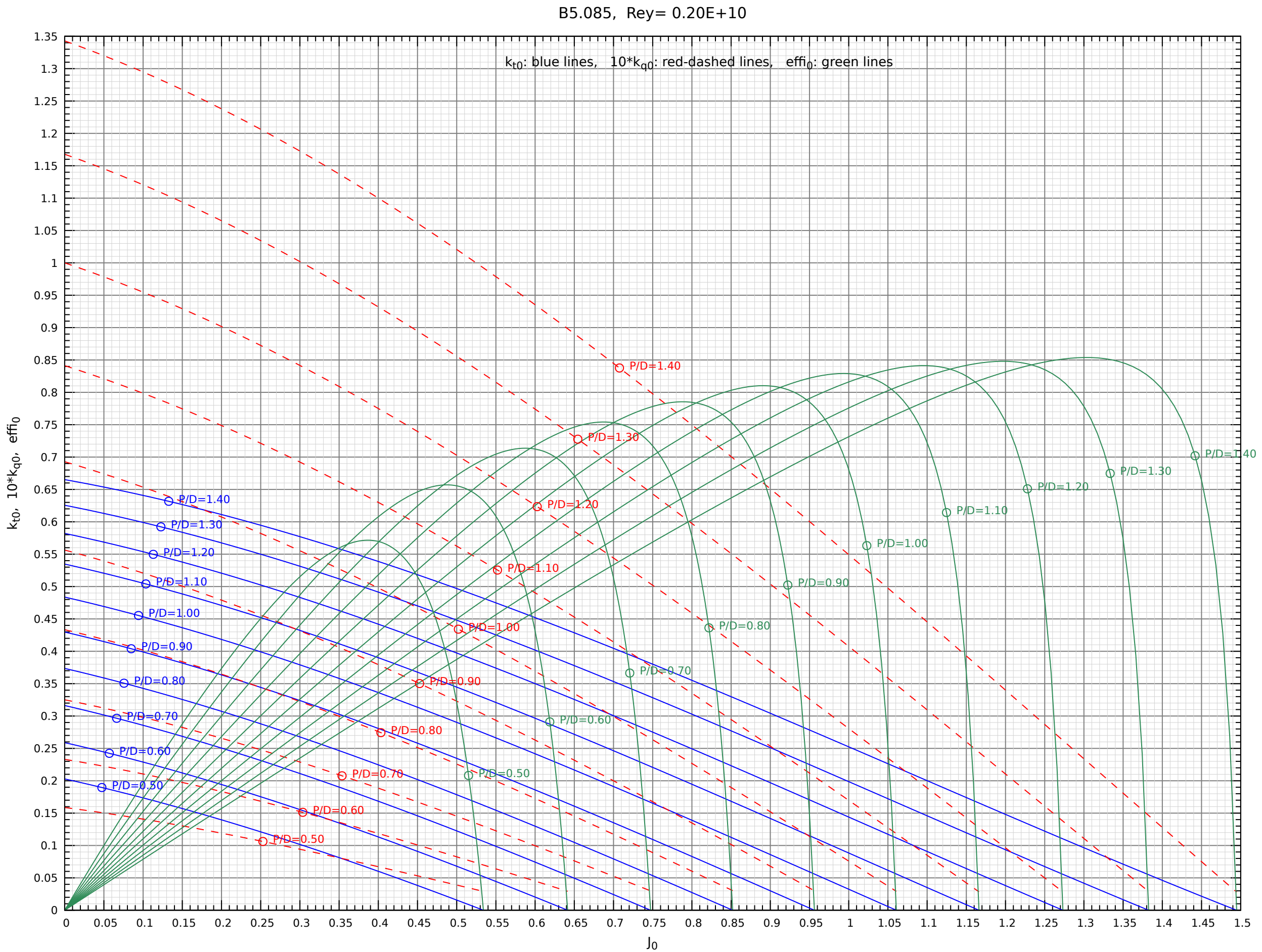
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P/D=1.40
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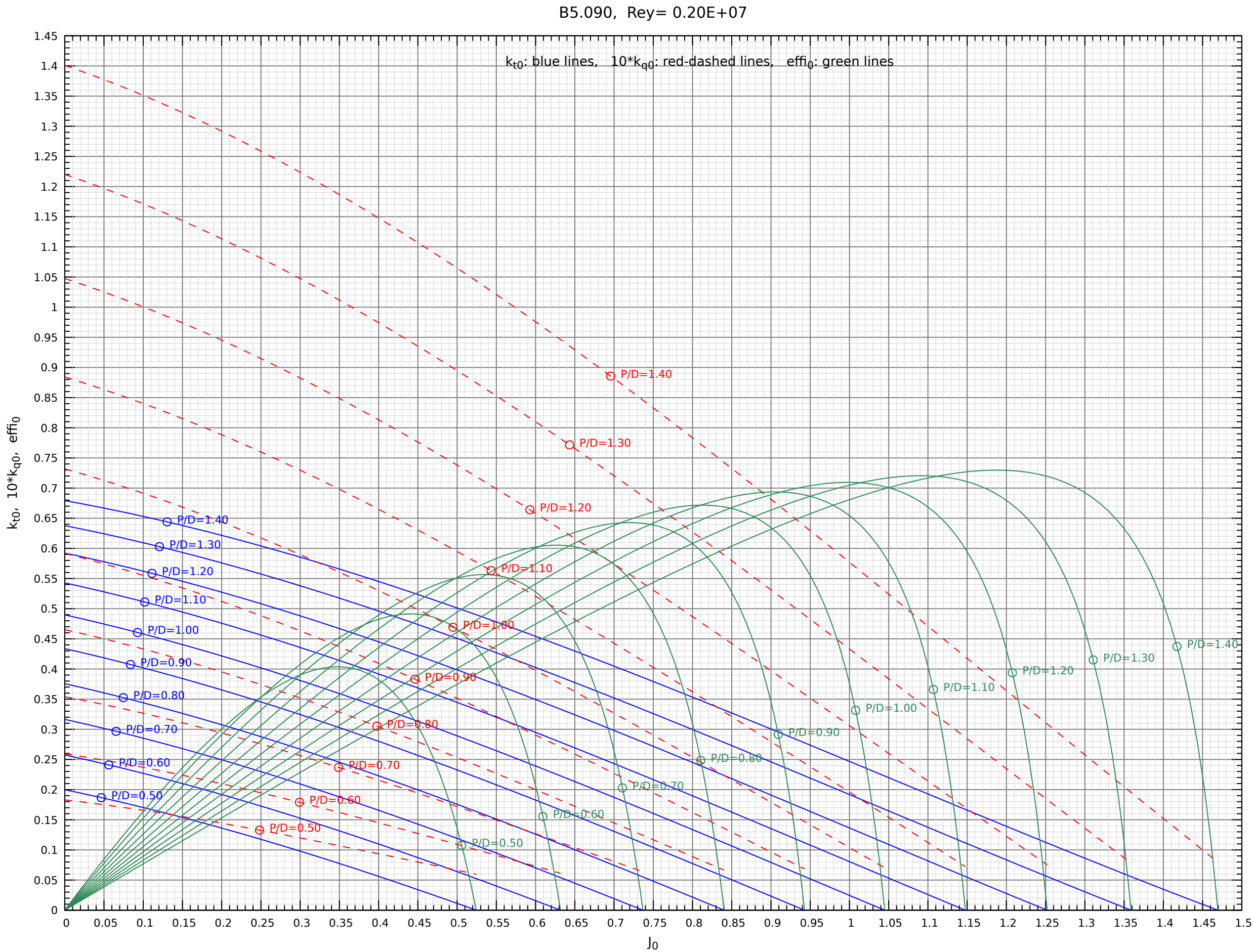
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
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P/D=1.20
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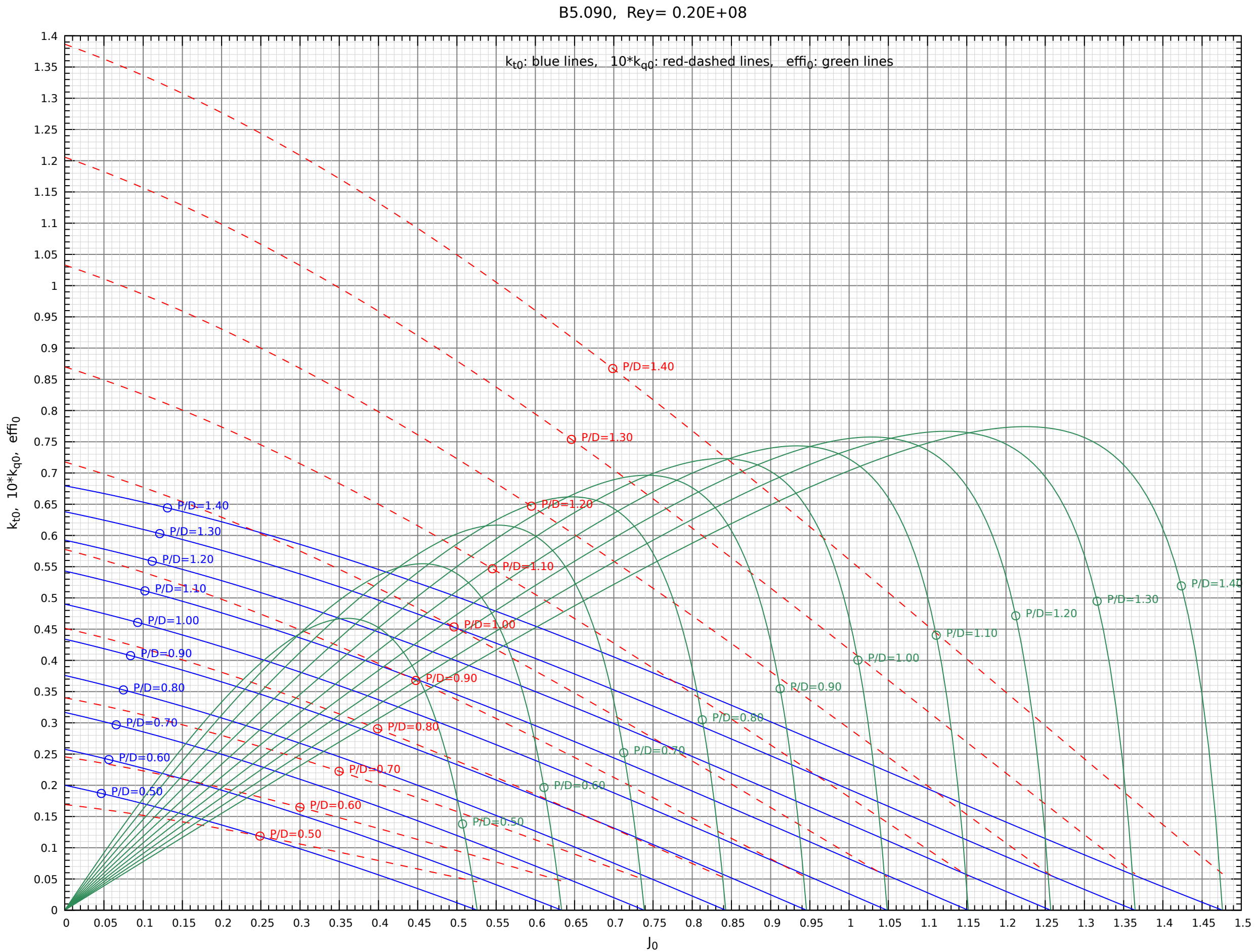
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
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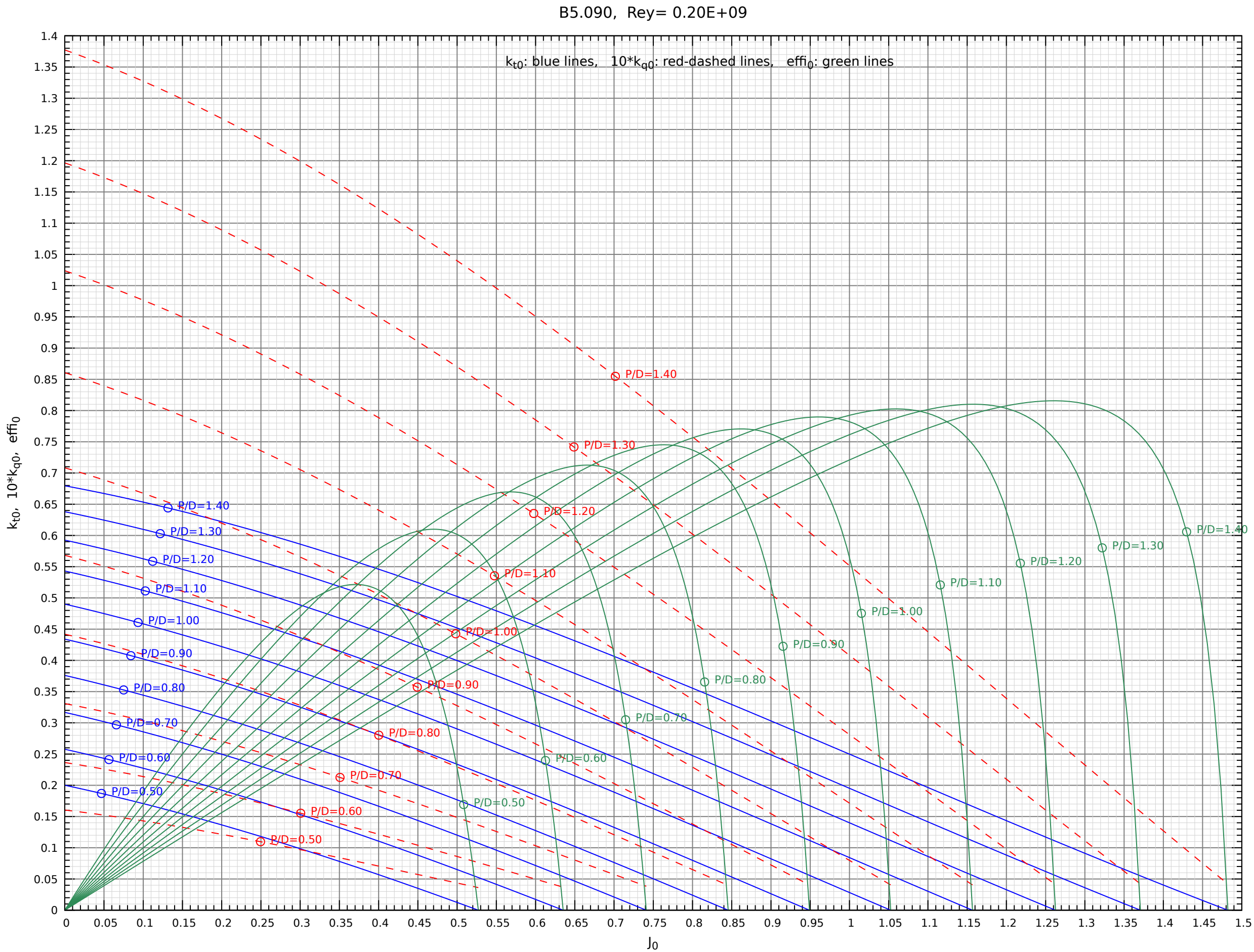
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P/D=1.40
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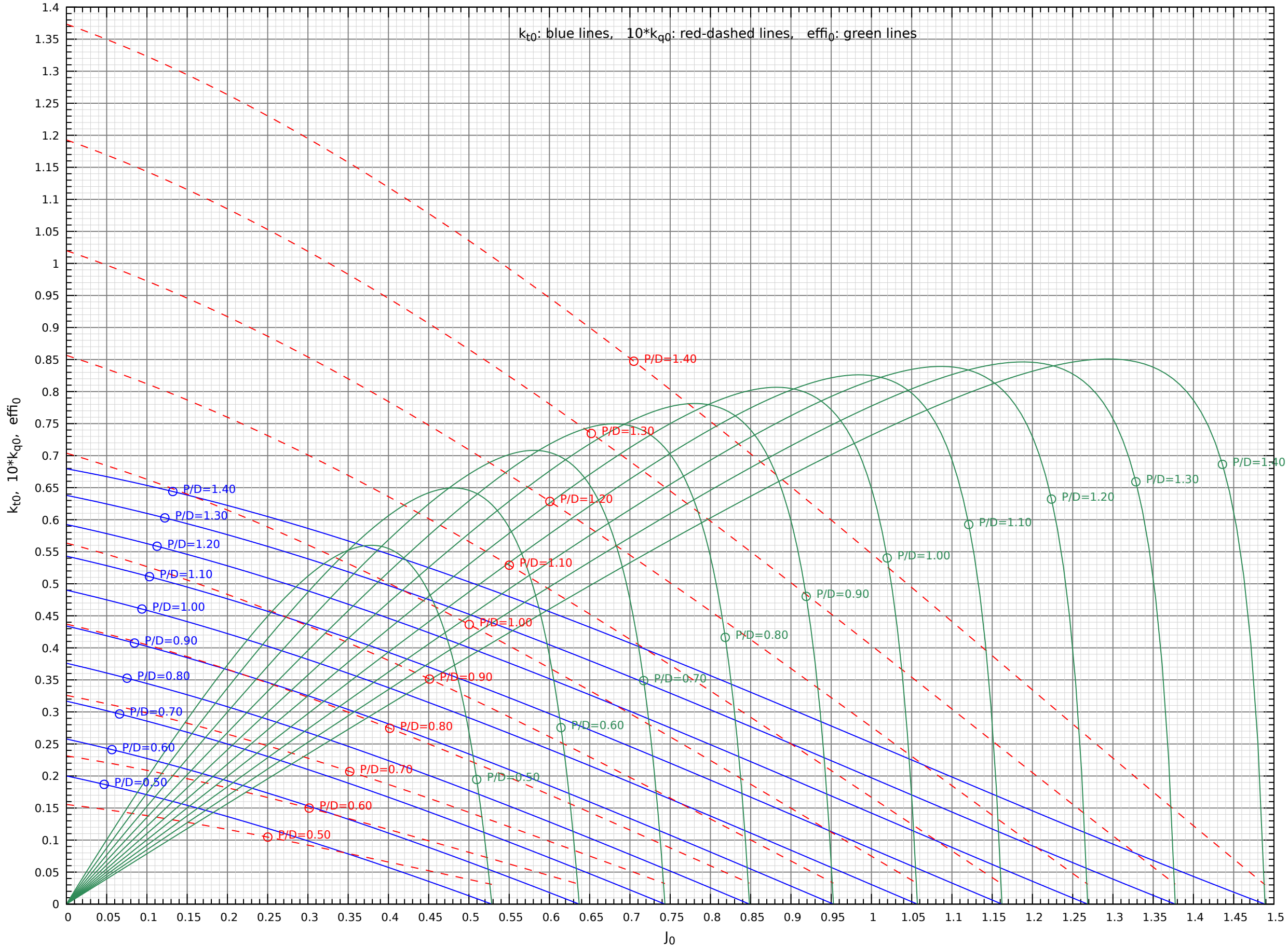

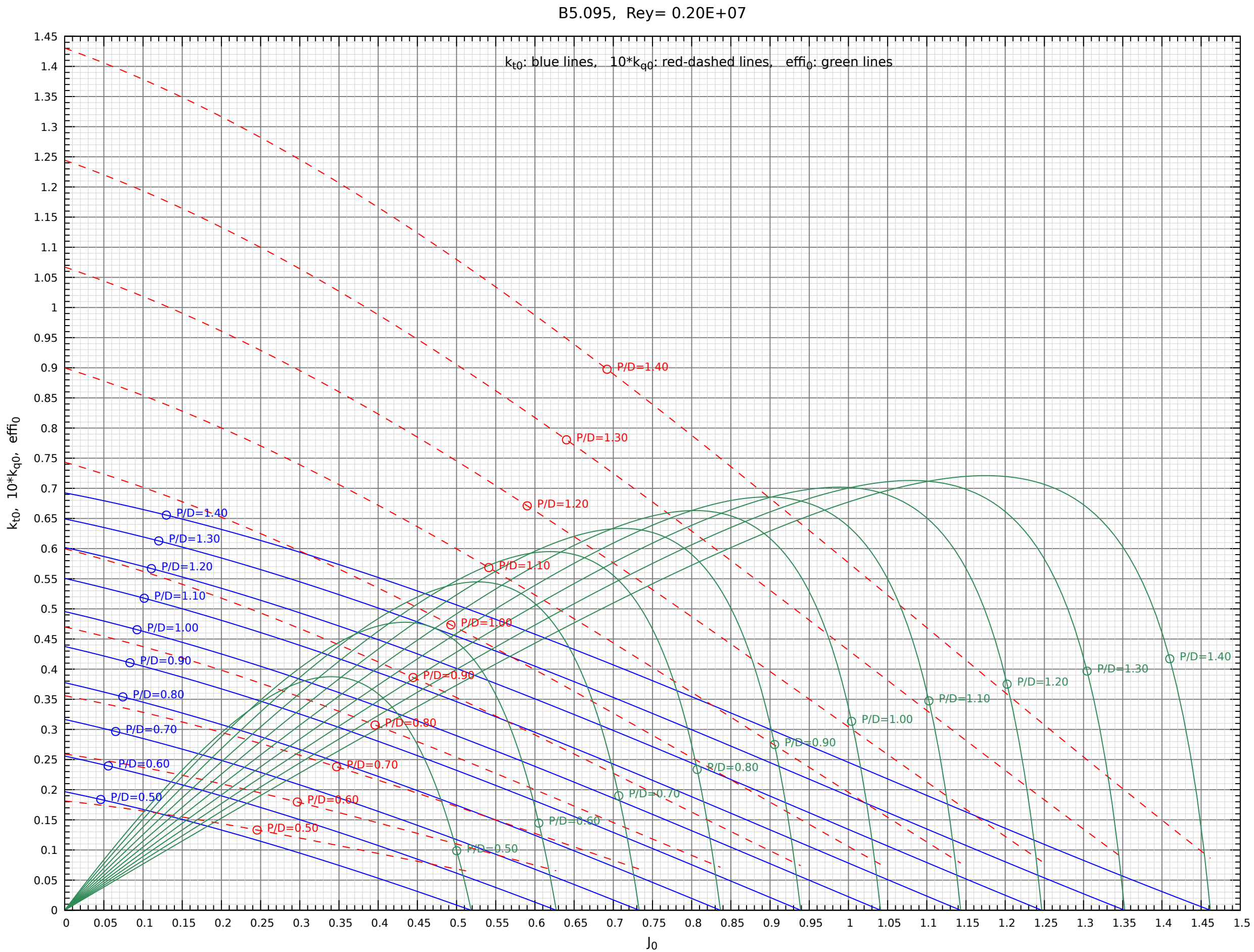
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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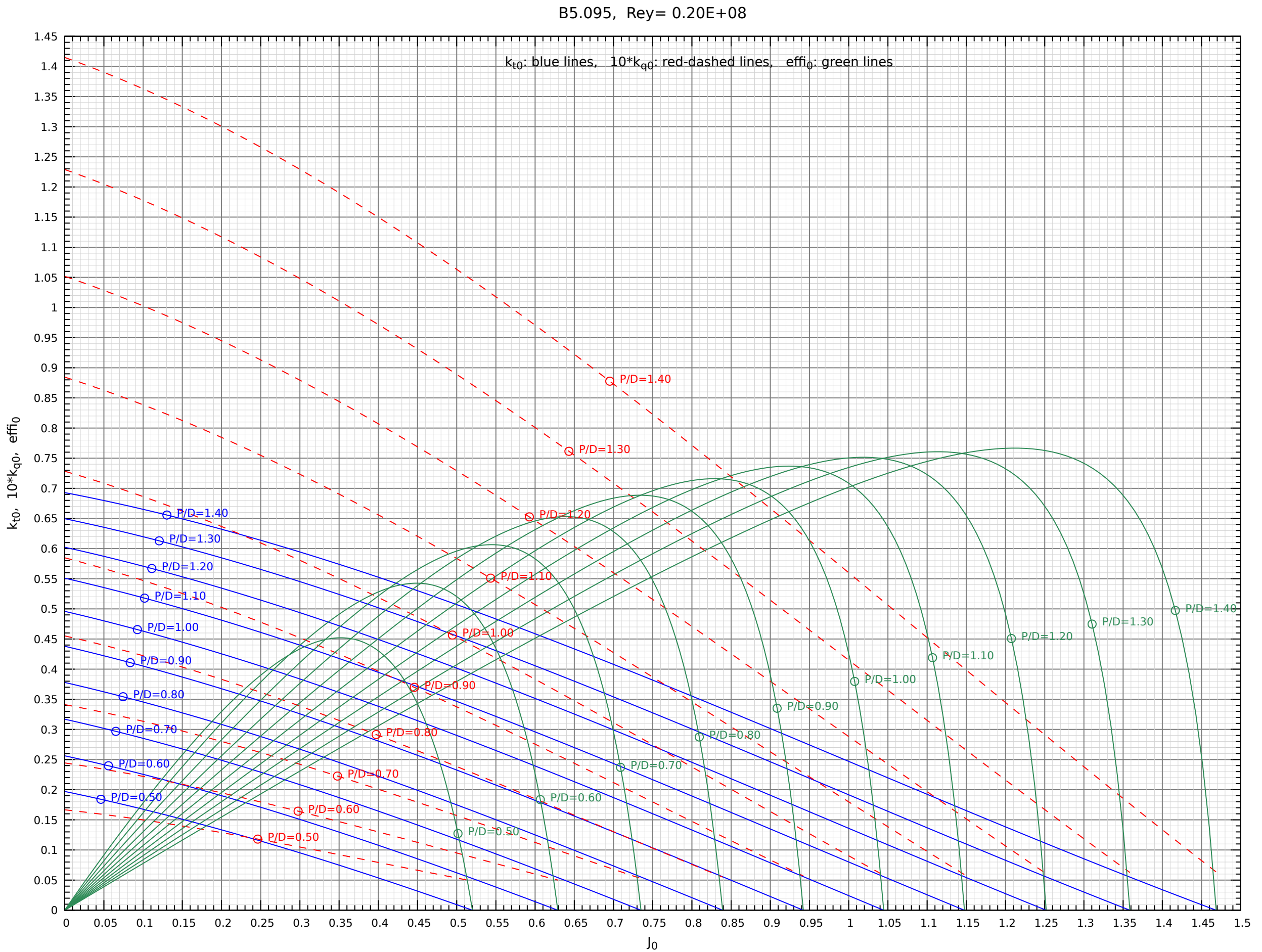
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J_0
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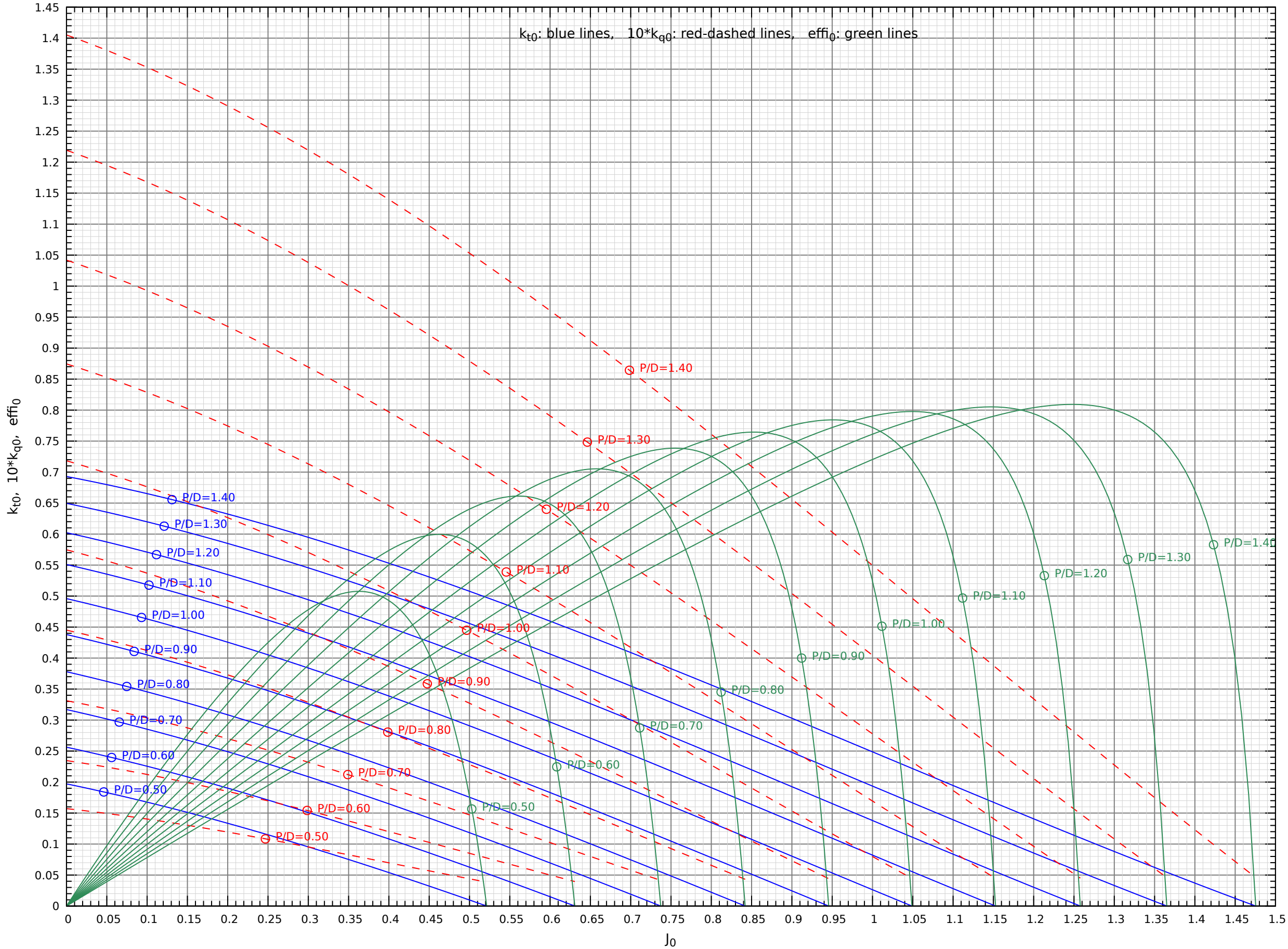

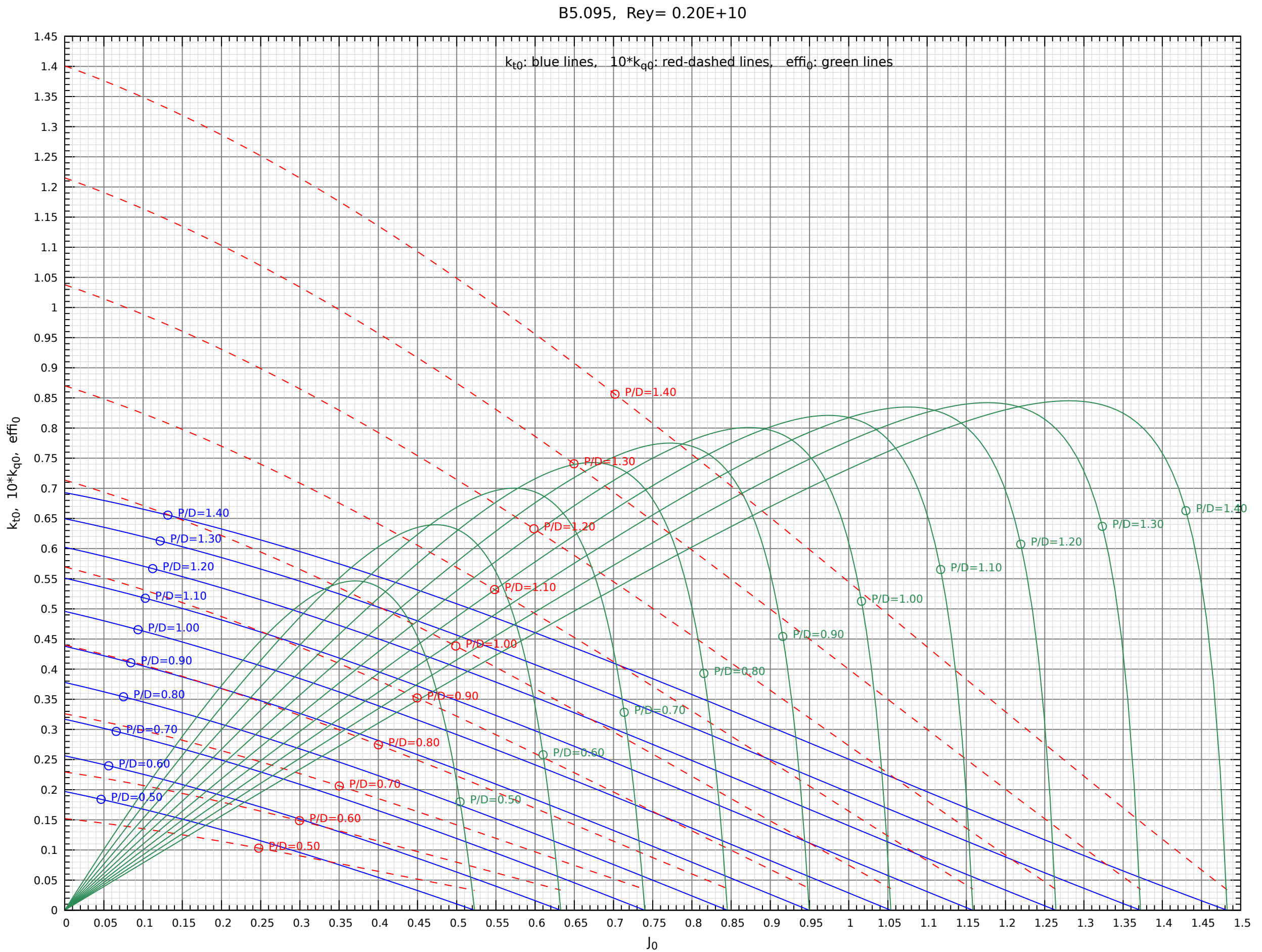
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
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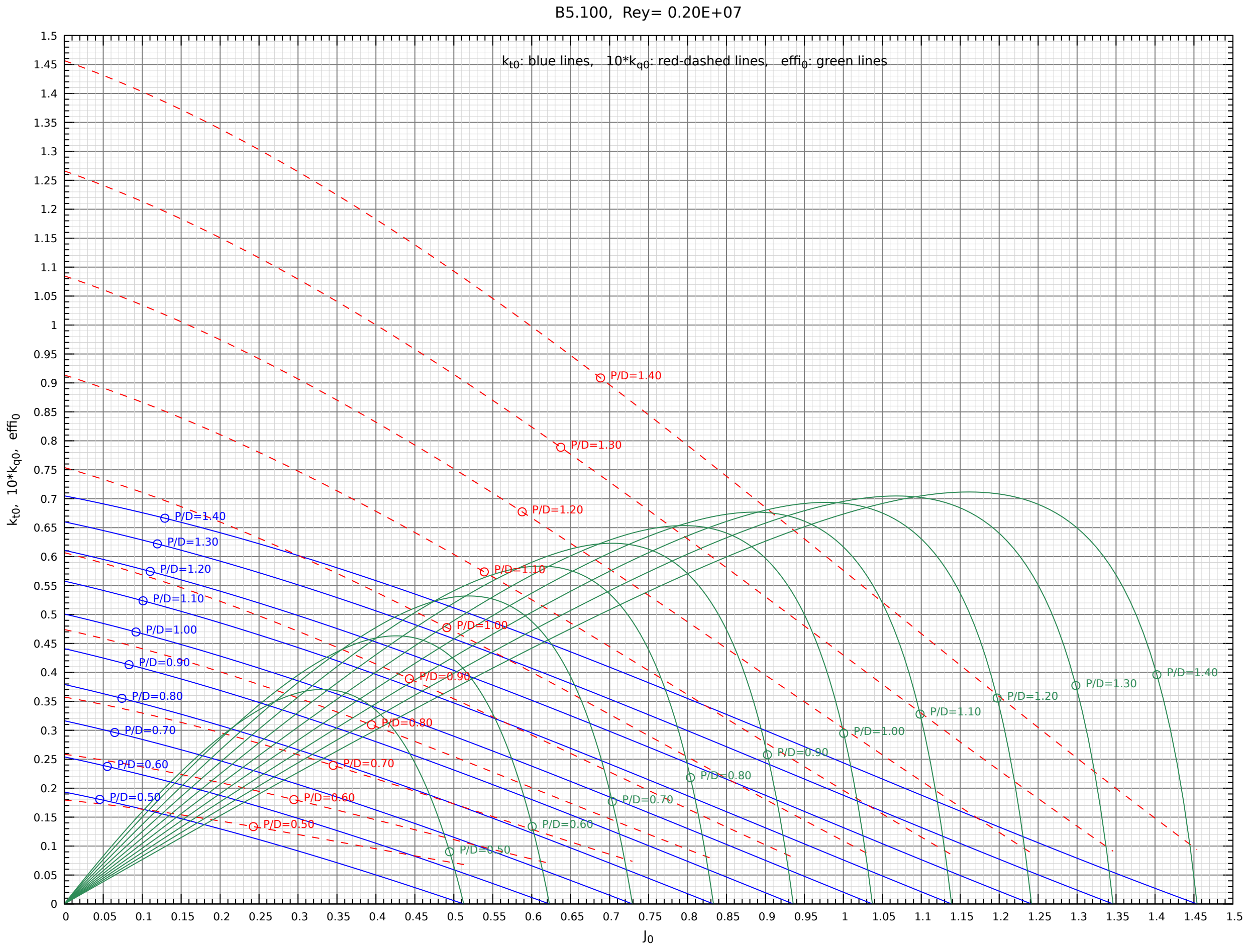
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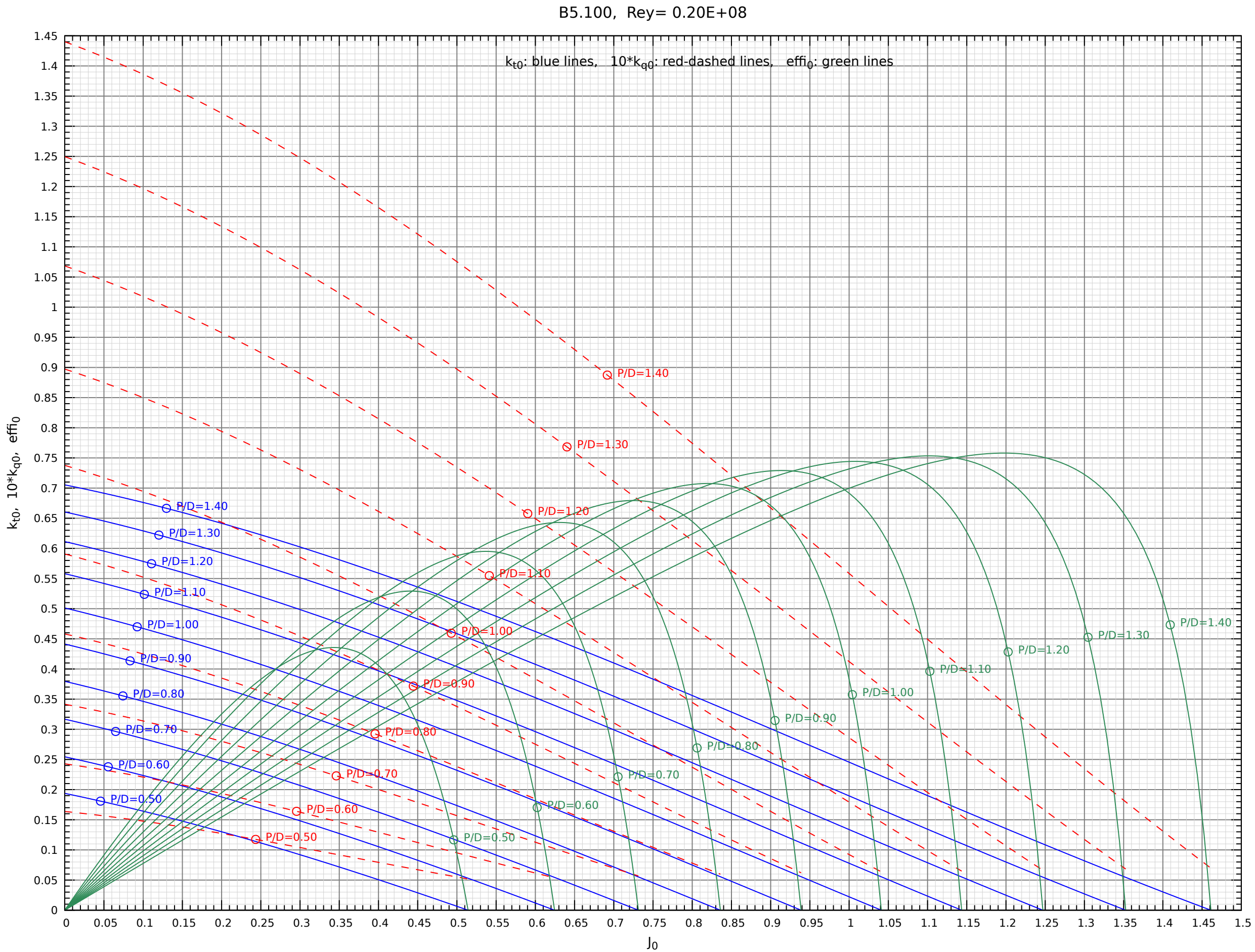
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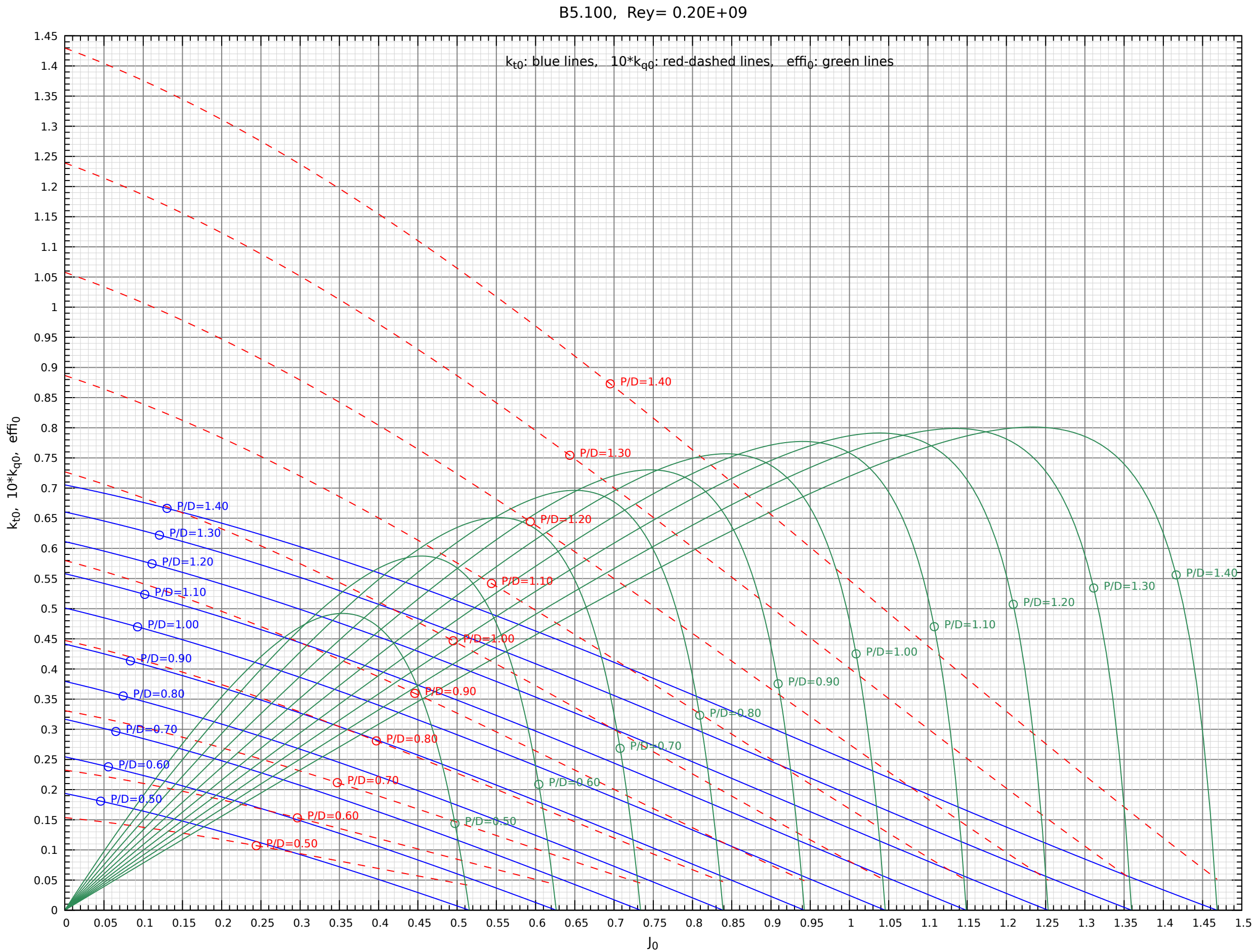
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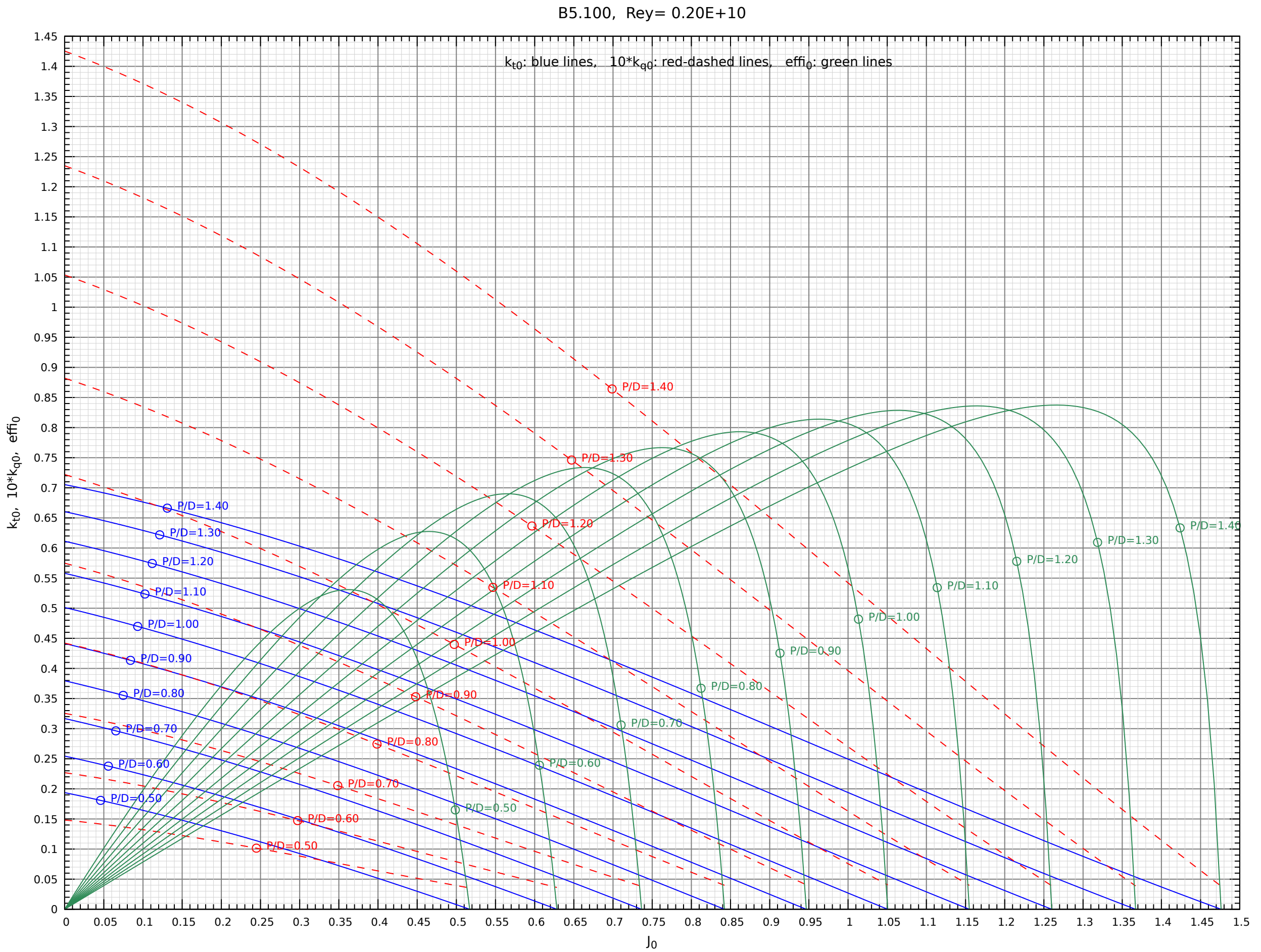
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k_{t0}, $10*k_{q0}$, $effi_0$
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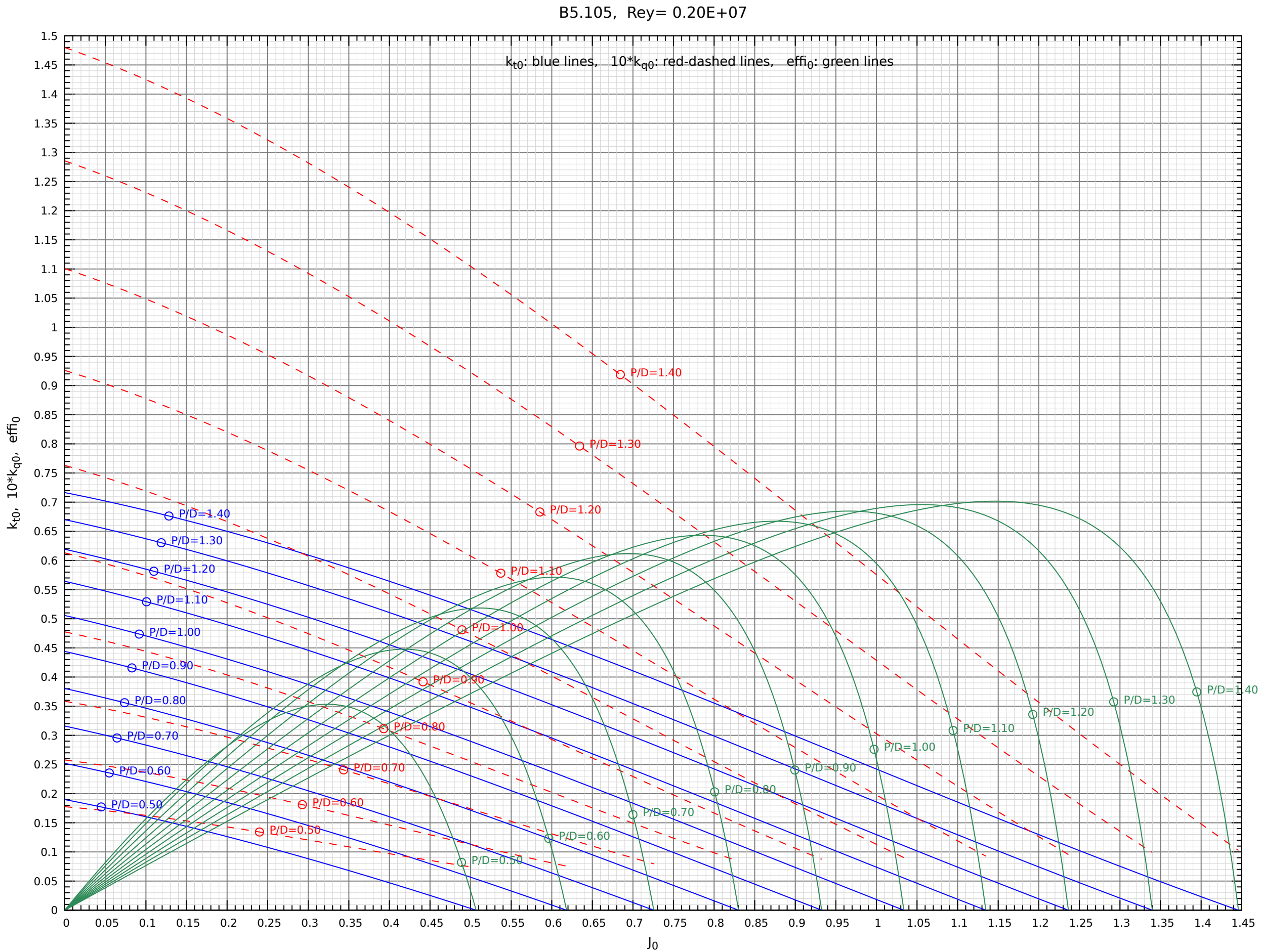
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k_{t0}, $10*k_{q0}$, $effi_0$
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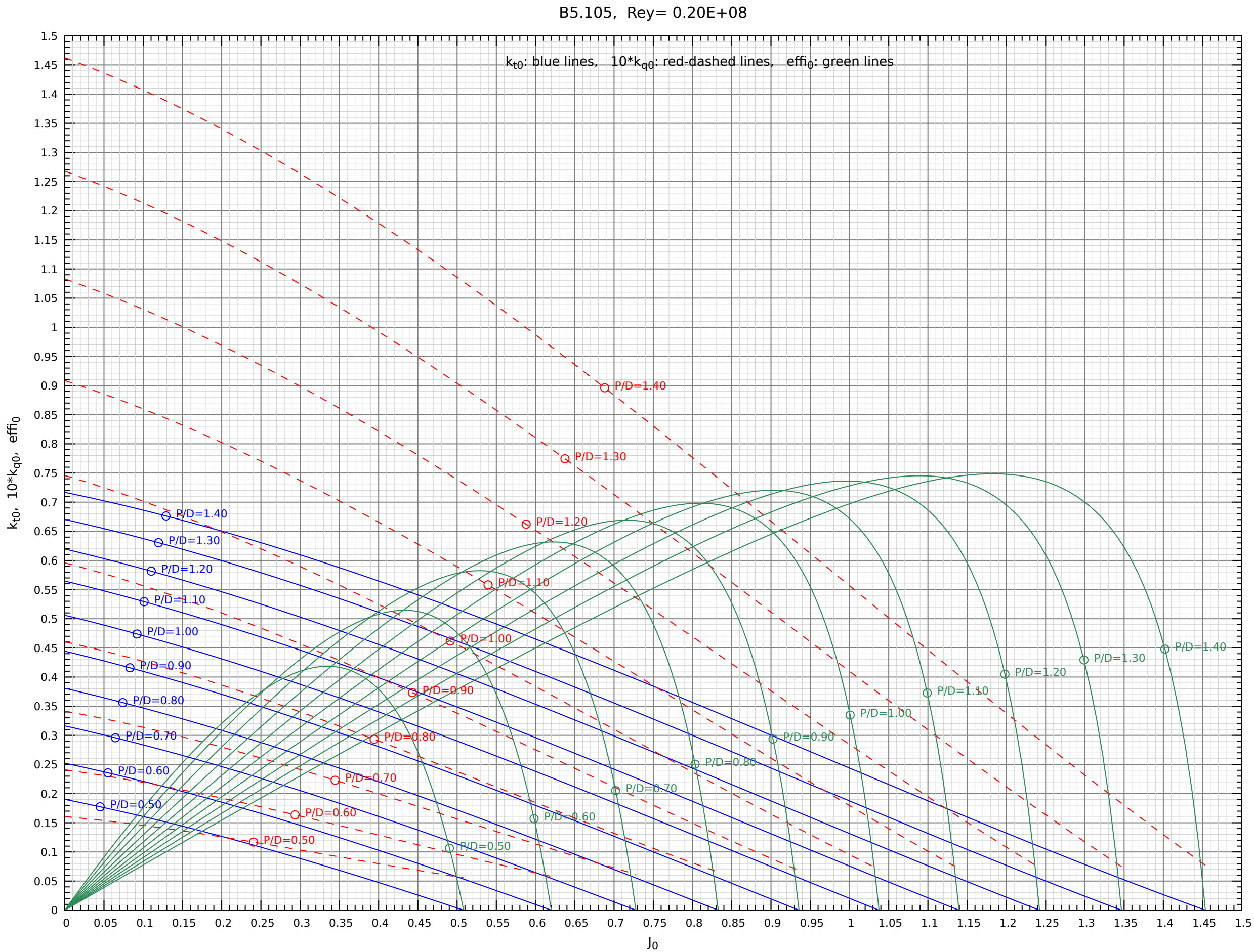
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.30
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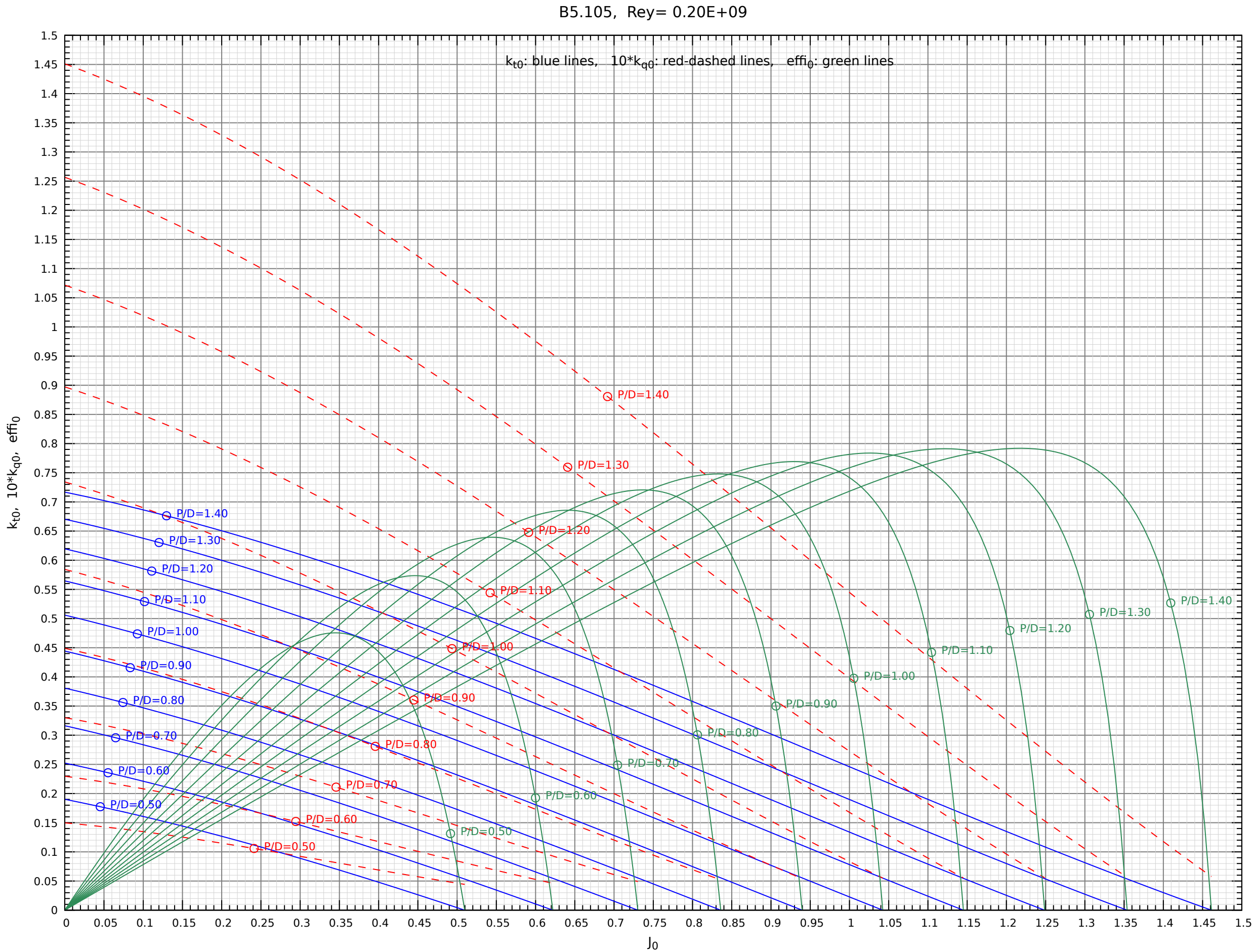
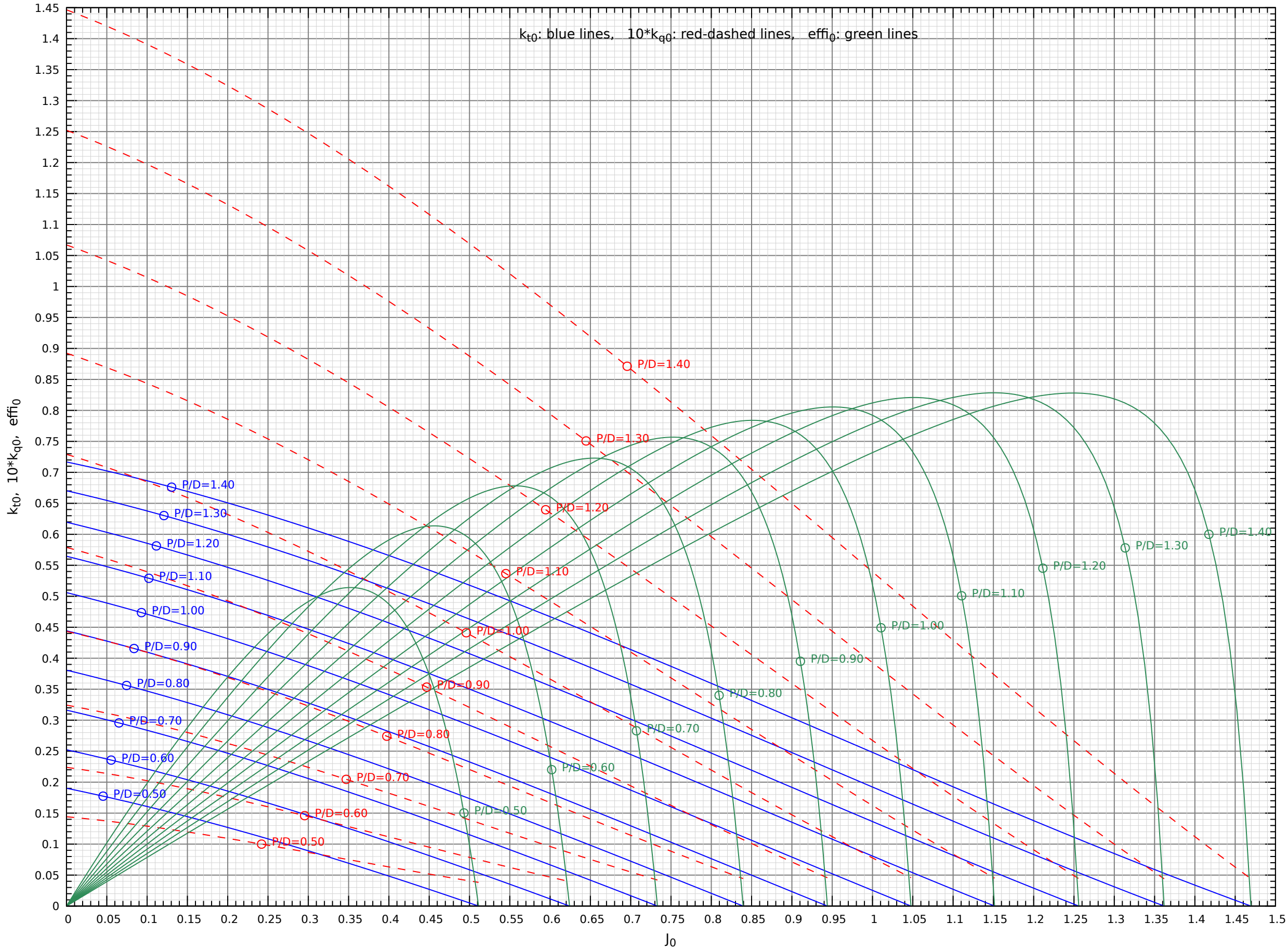
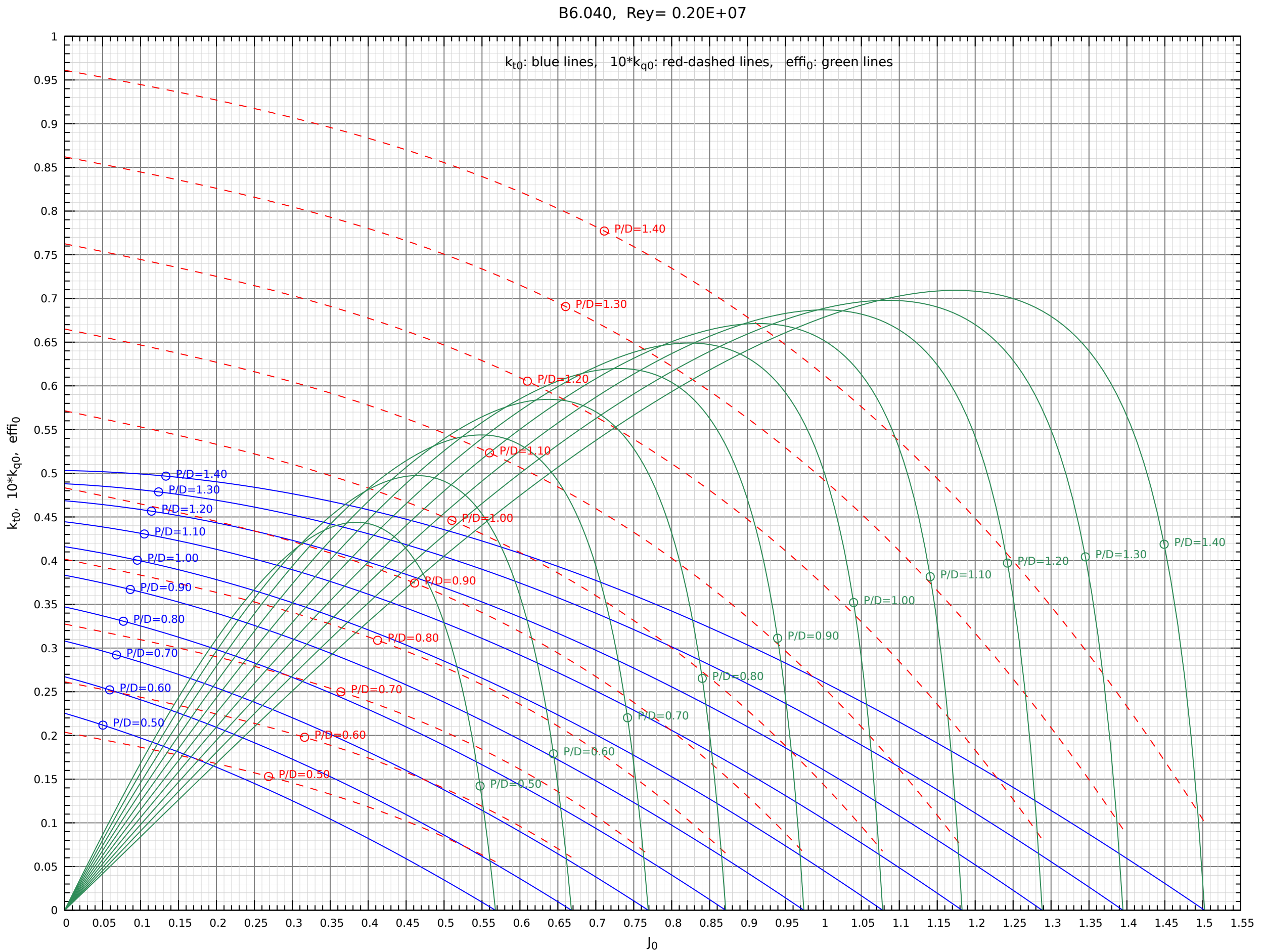
P/D=0.50

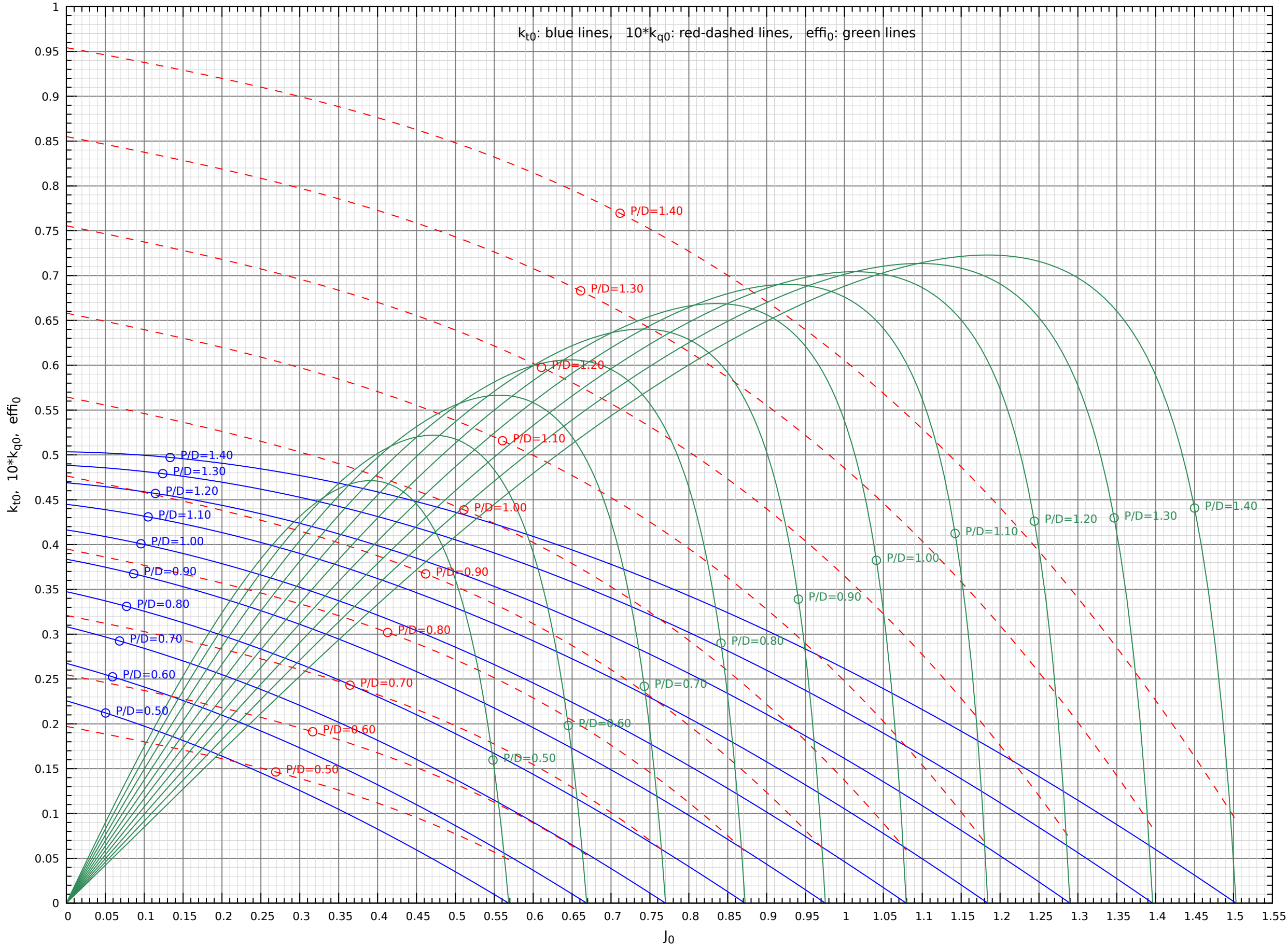

B5.105, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

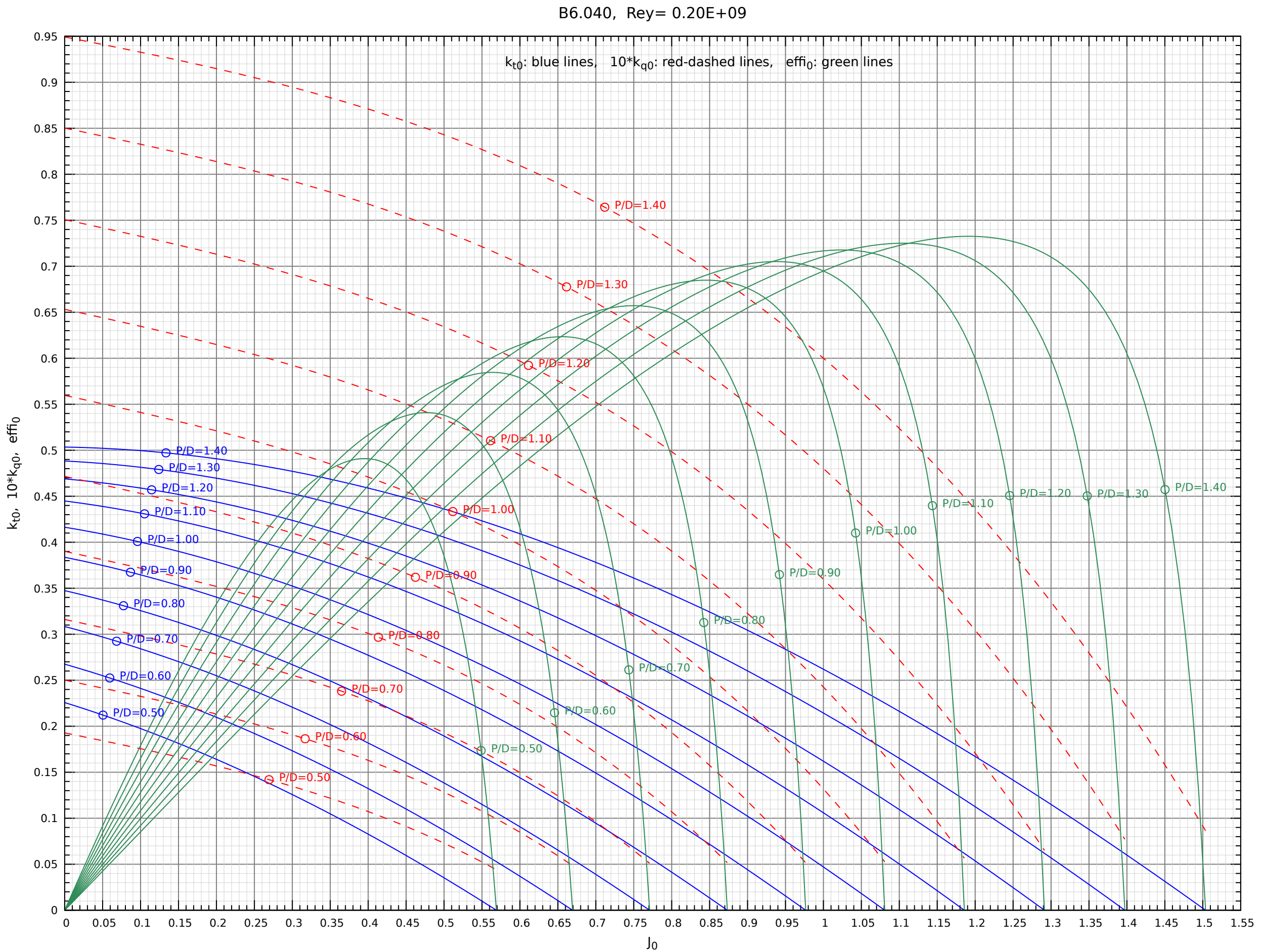
B5.105, Rey= 0.20E+10

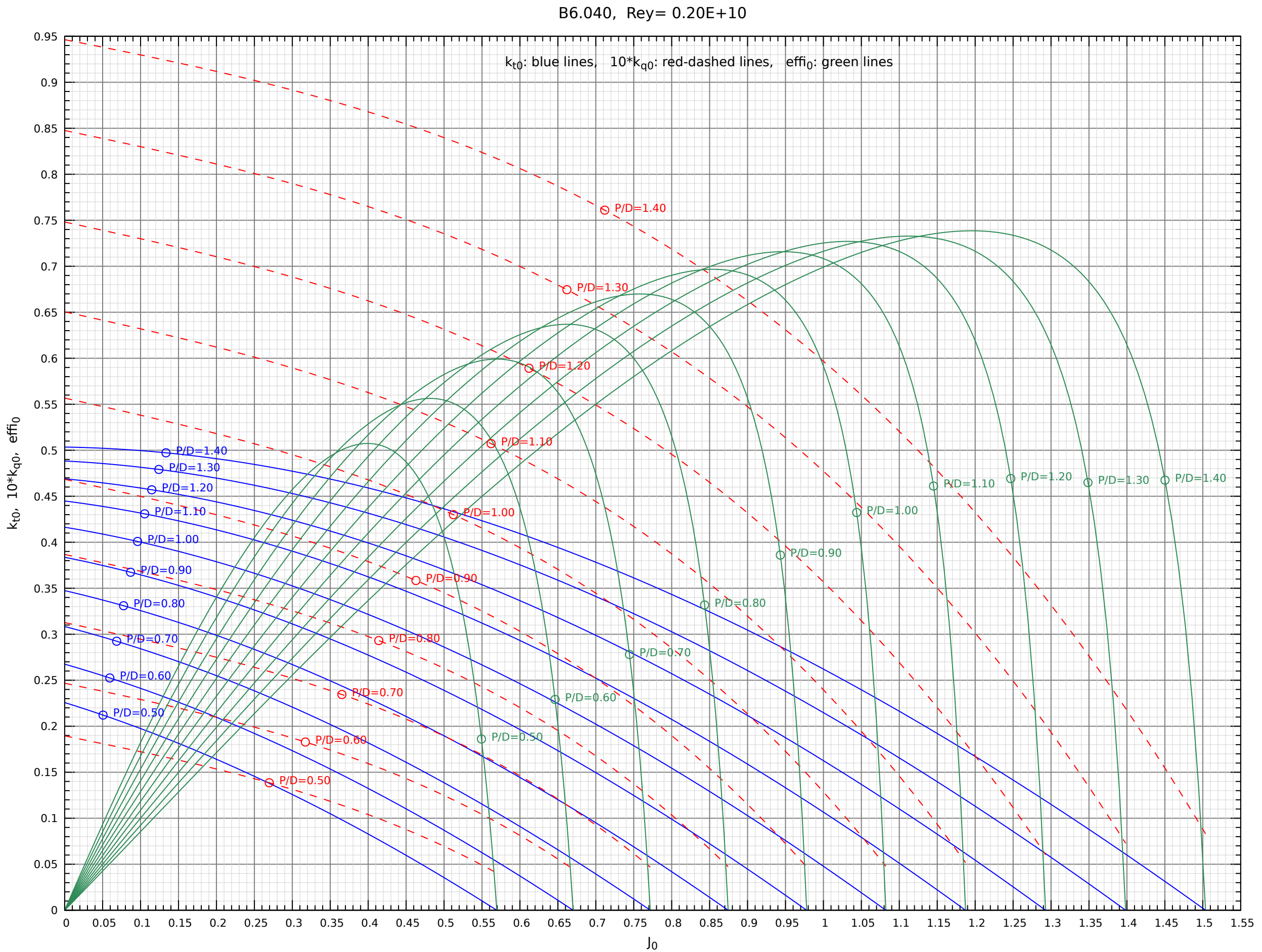


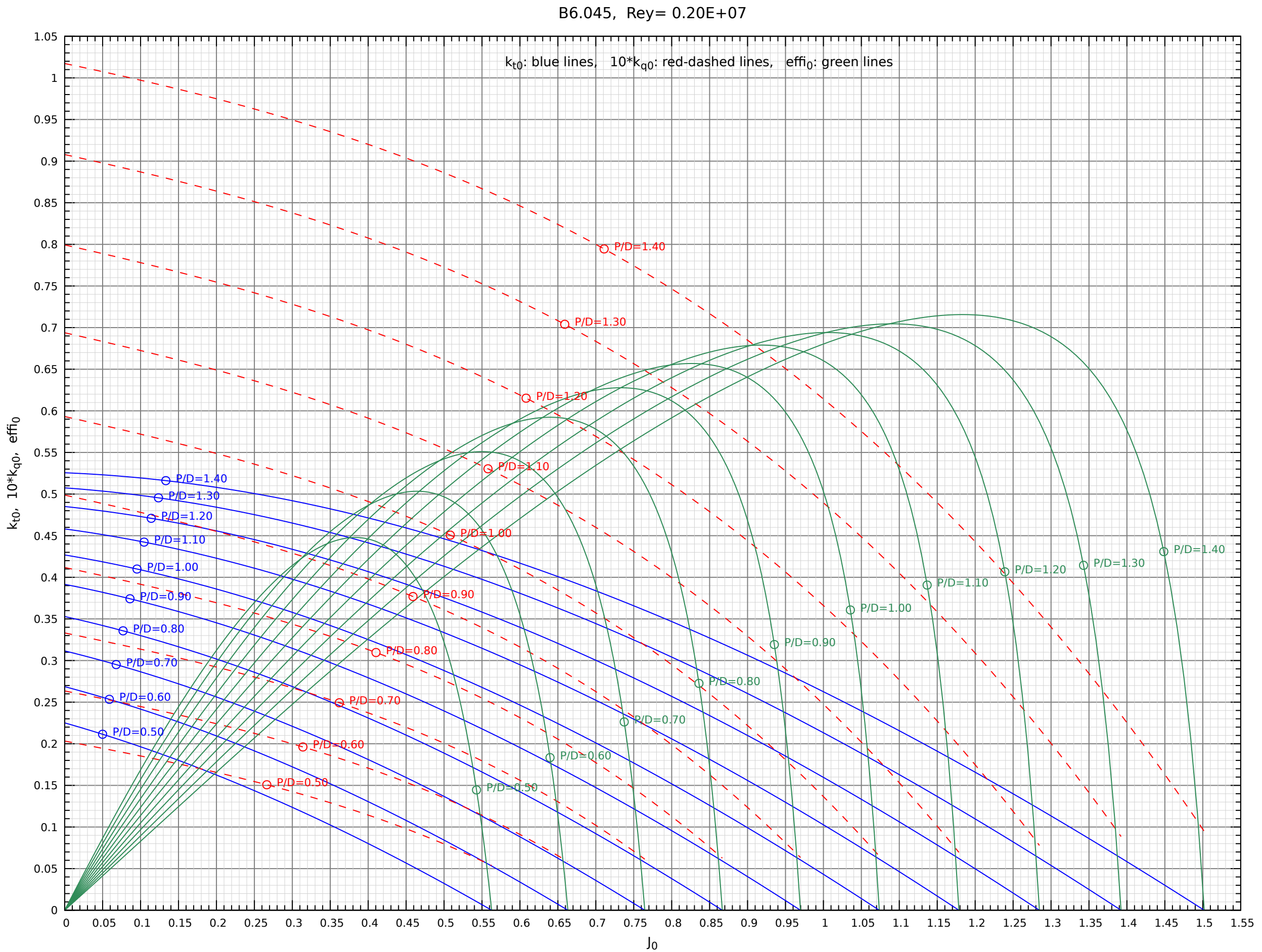

B6.040, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0

B6.040, Rey= 0.20E+08




B6.040, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.040, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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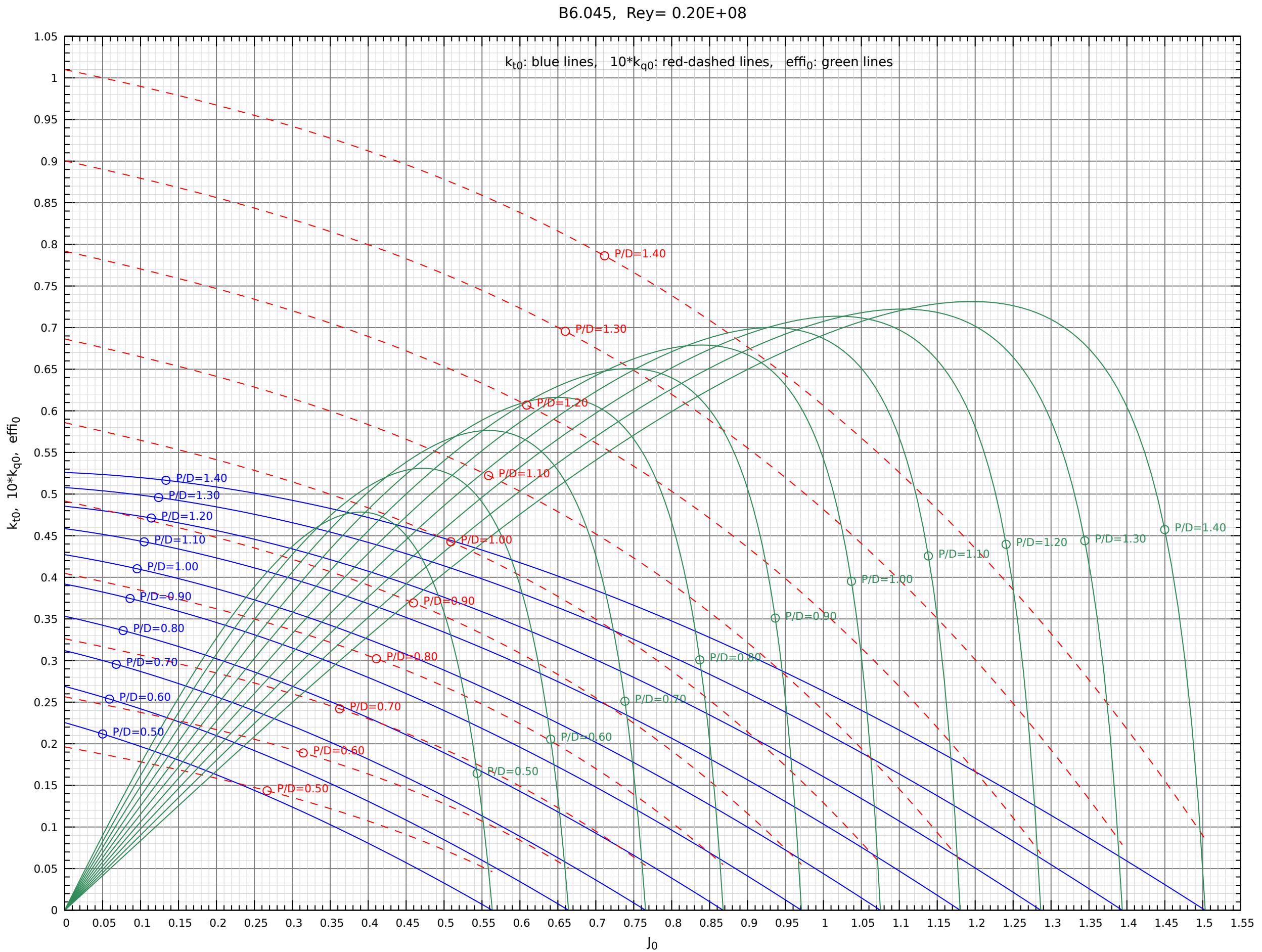
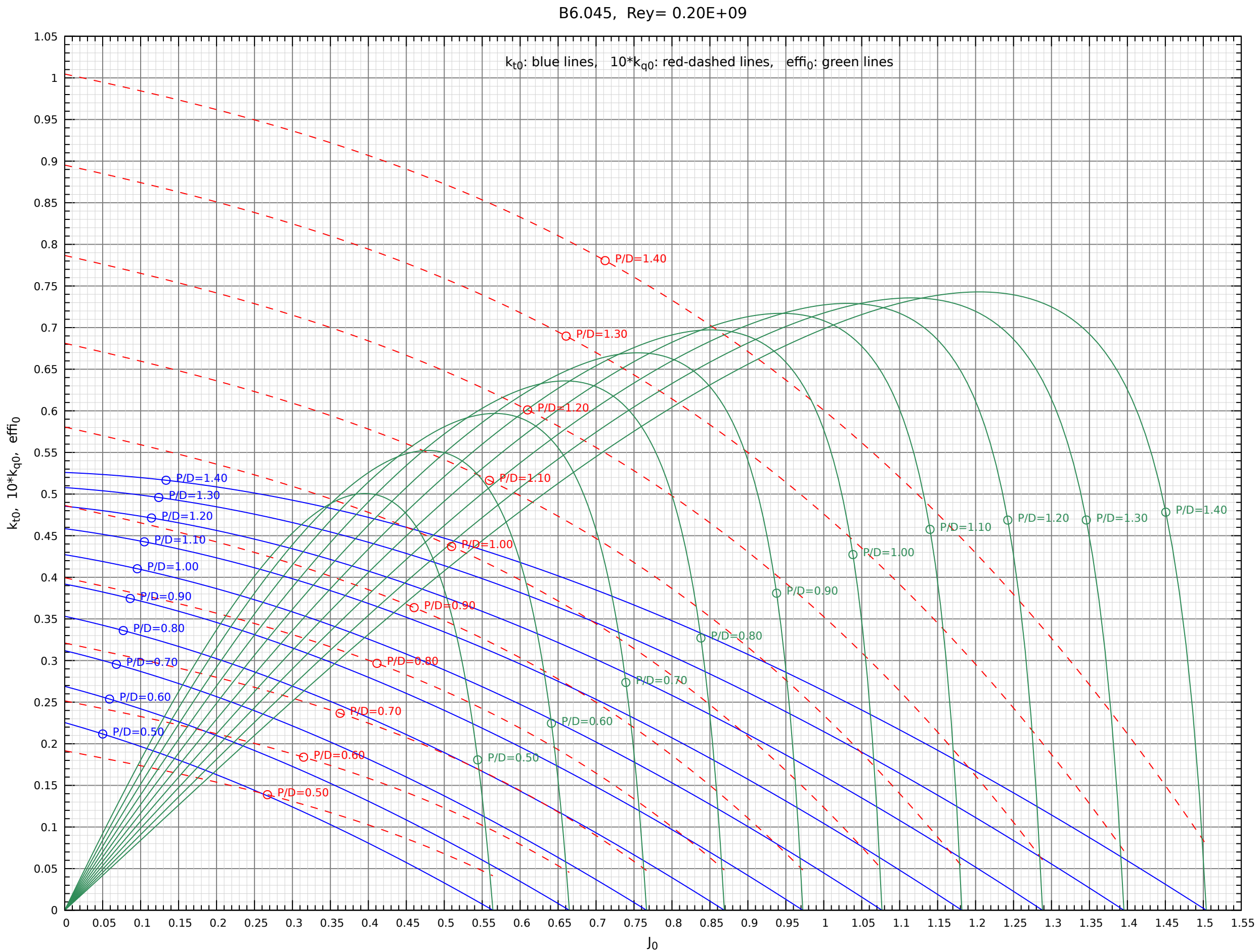
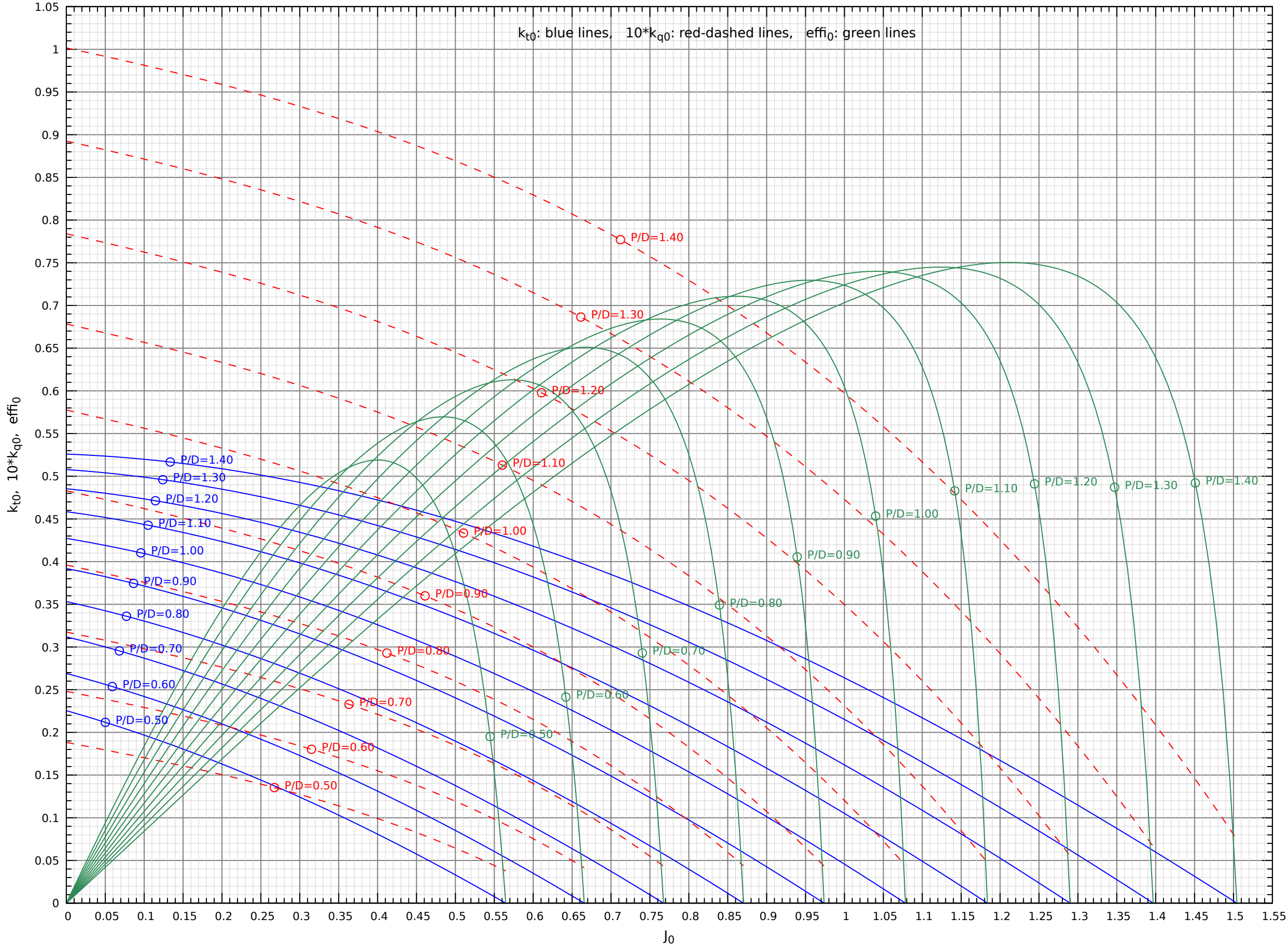
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

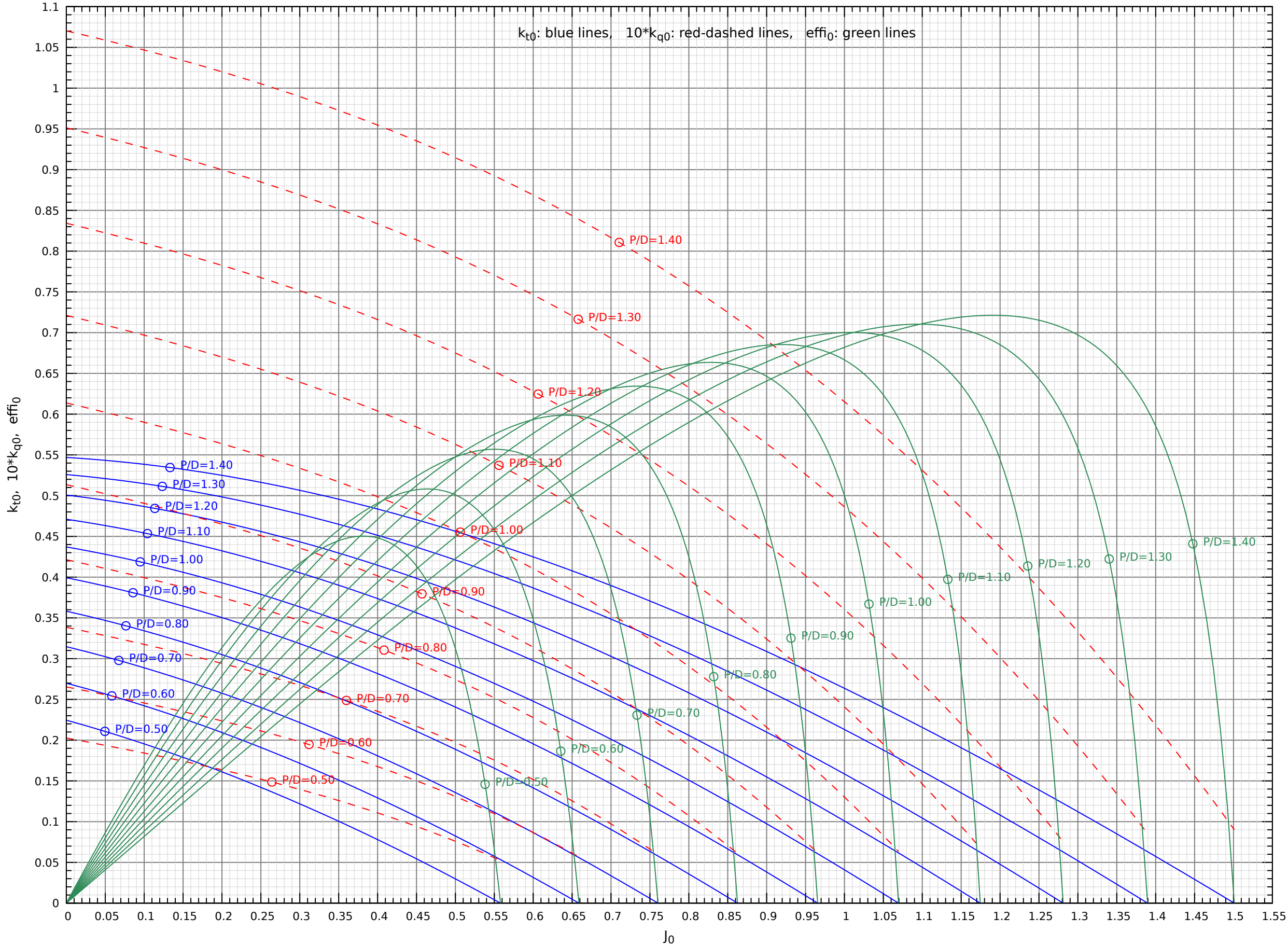

B6.045, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.045, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

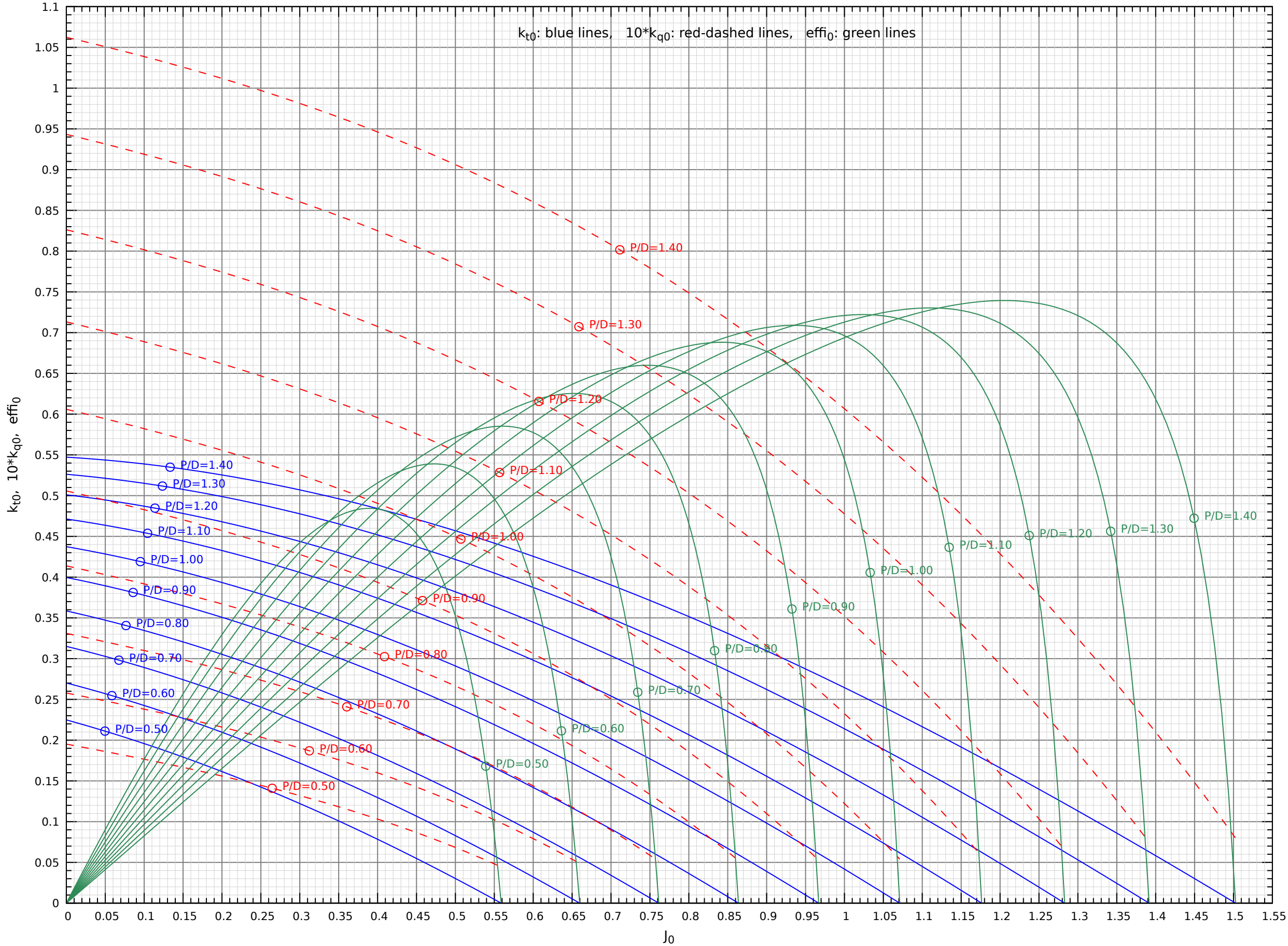
B6.045, Rey= 0.20E+10

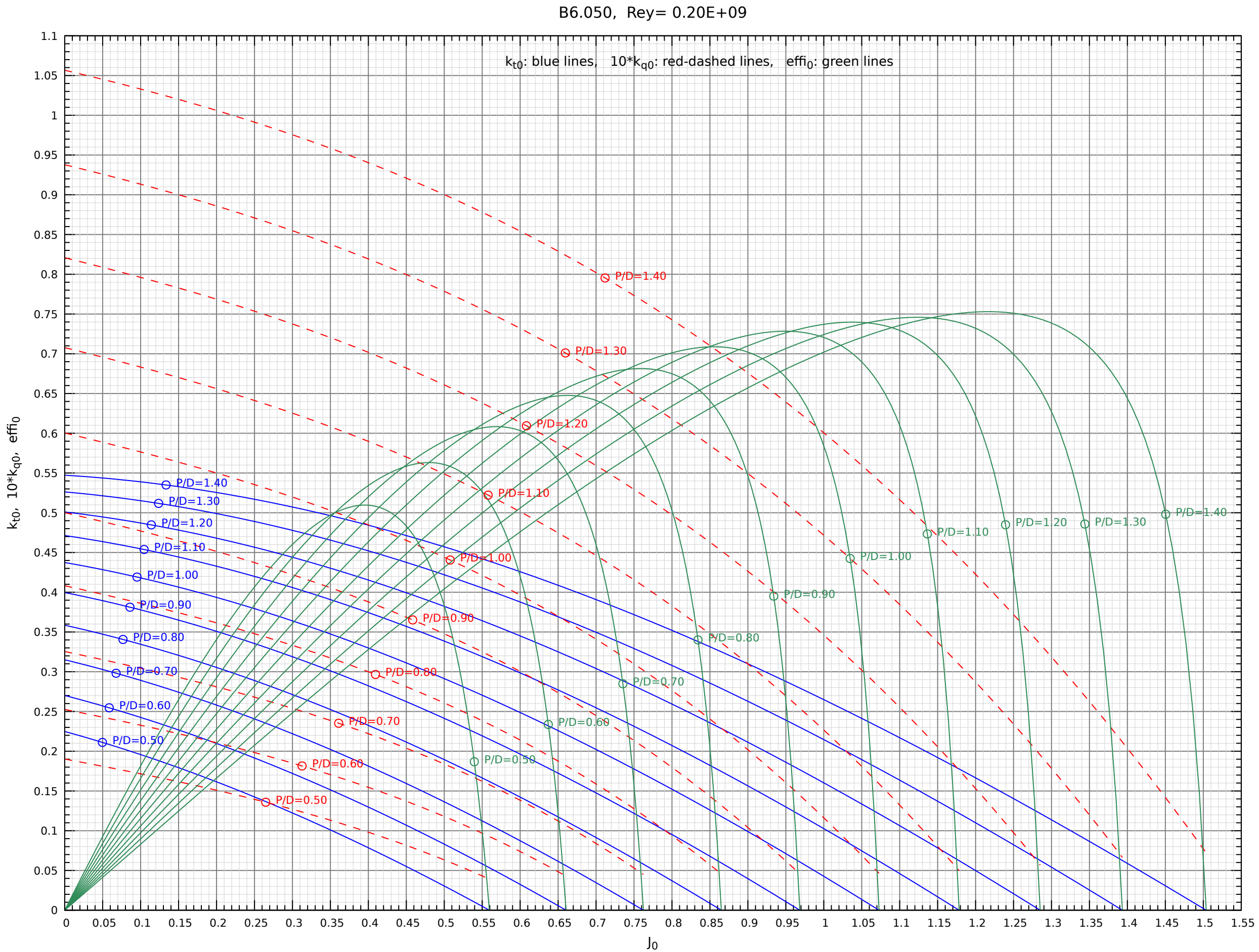


B6.050, Rey= 0.20E+07



B6.050, Rey= 0.20E+08




B6.050, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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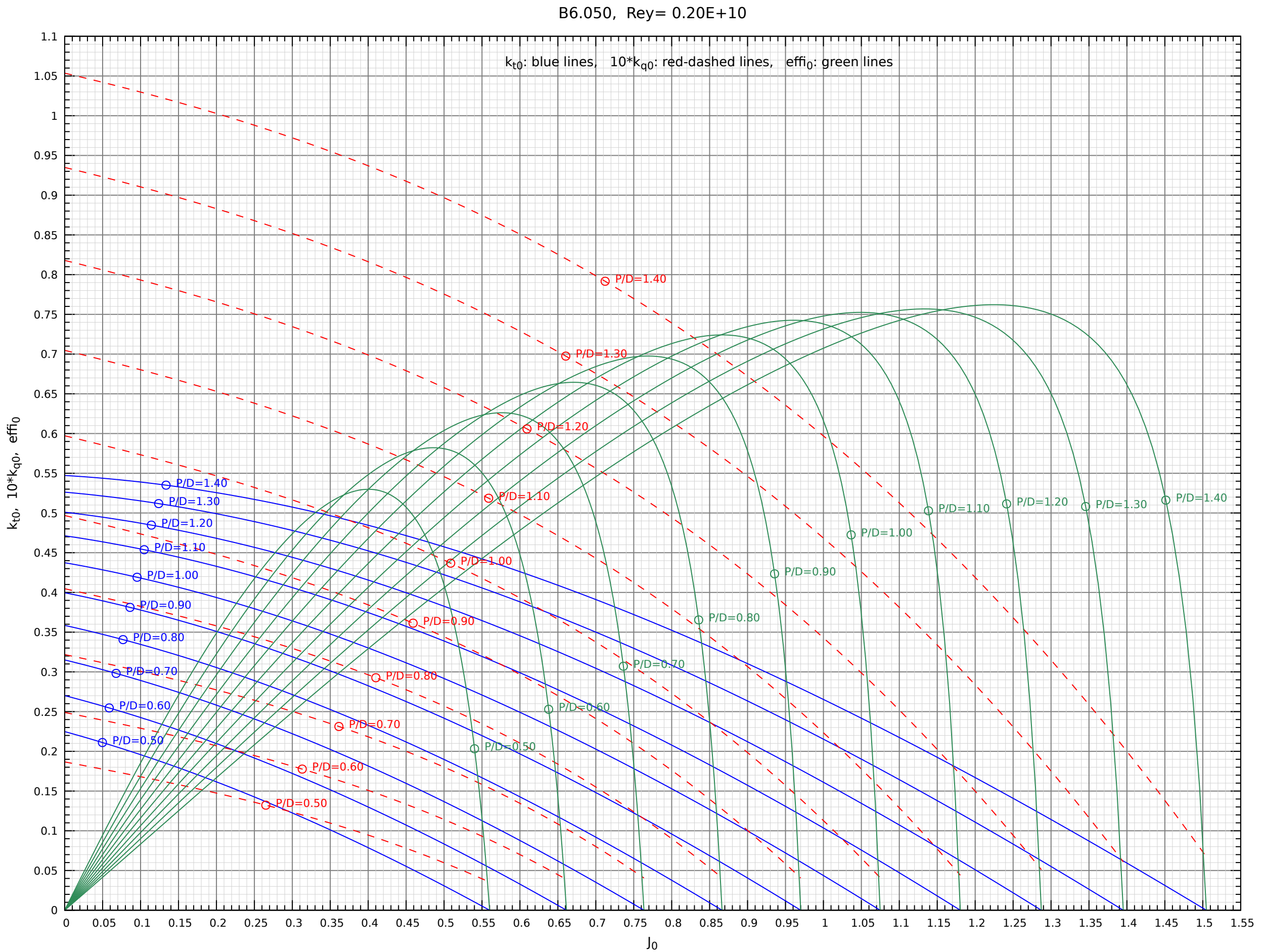
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
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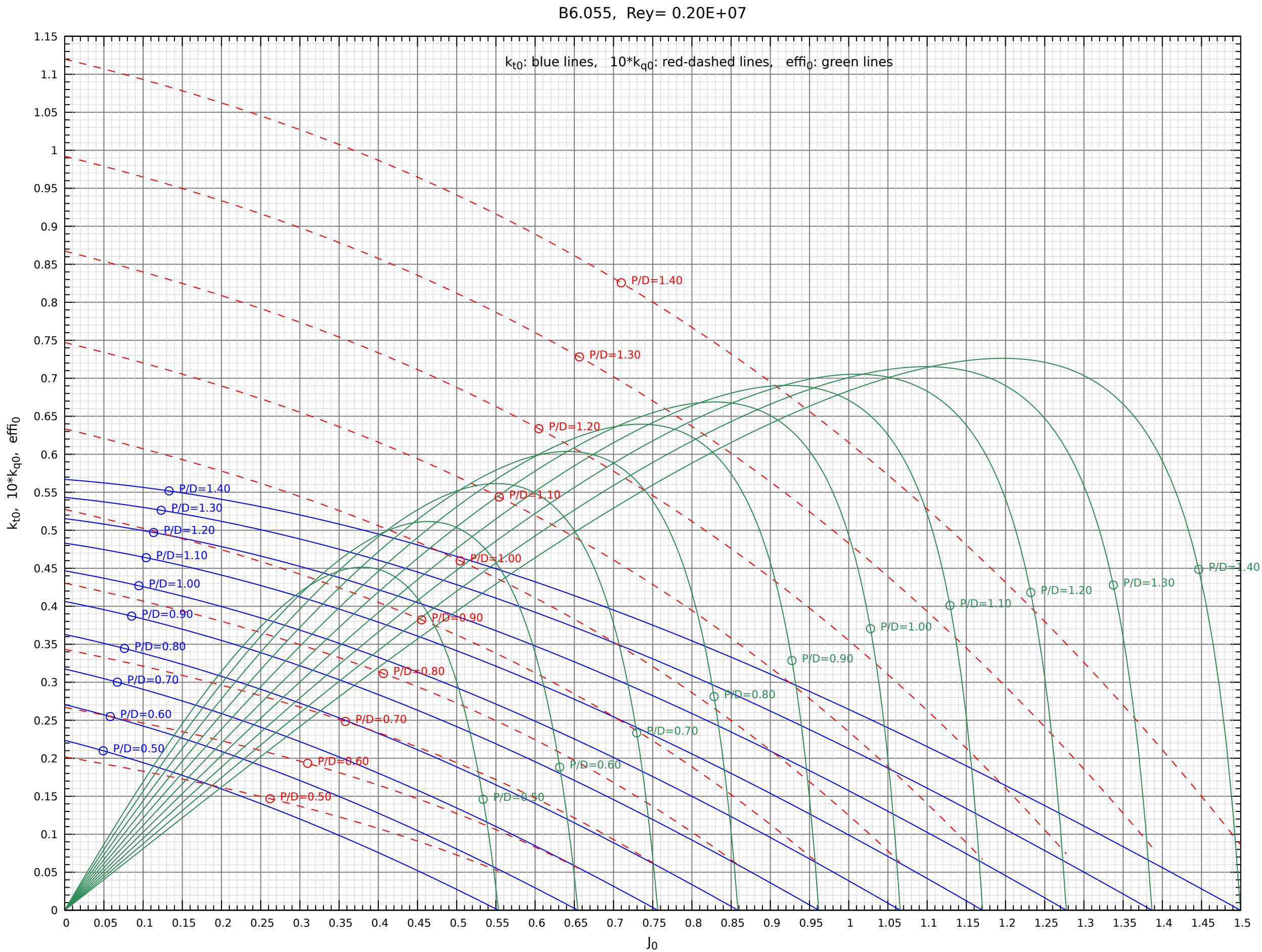
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0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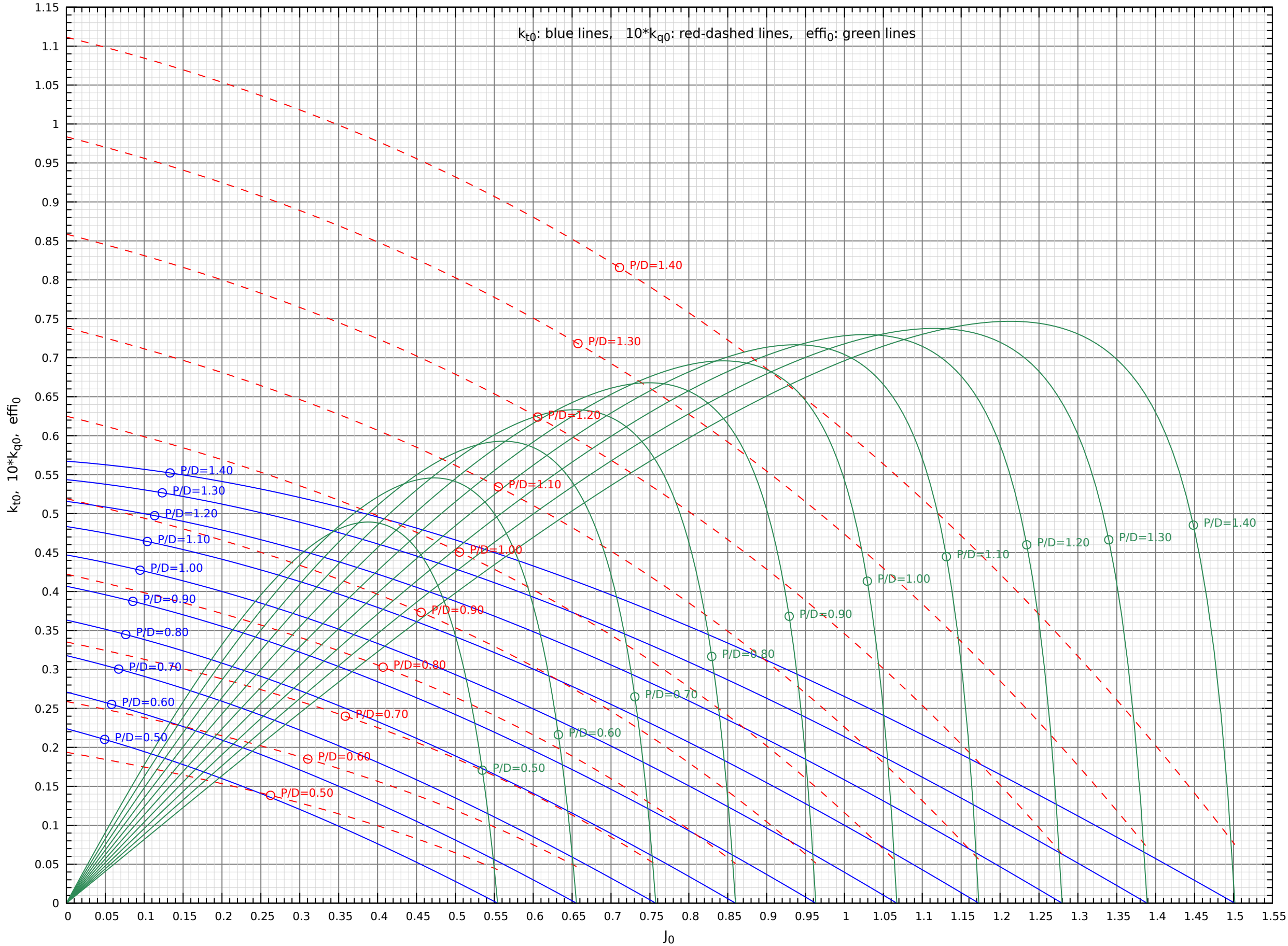
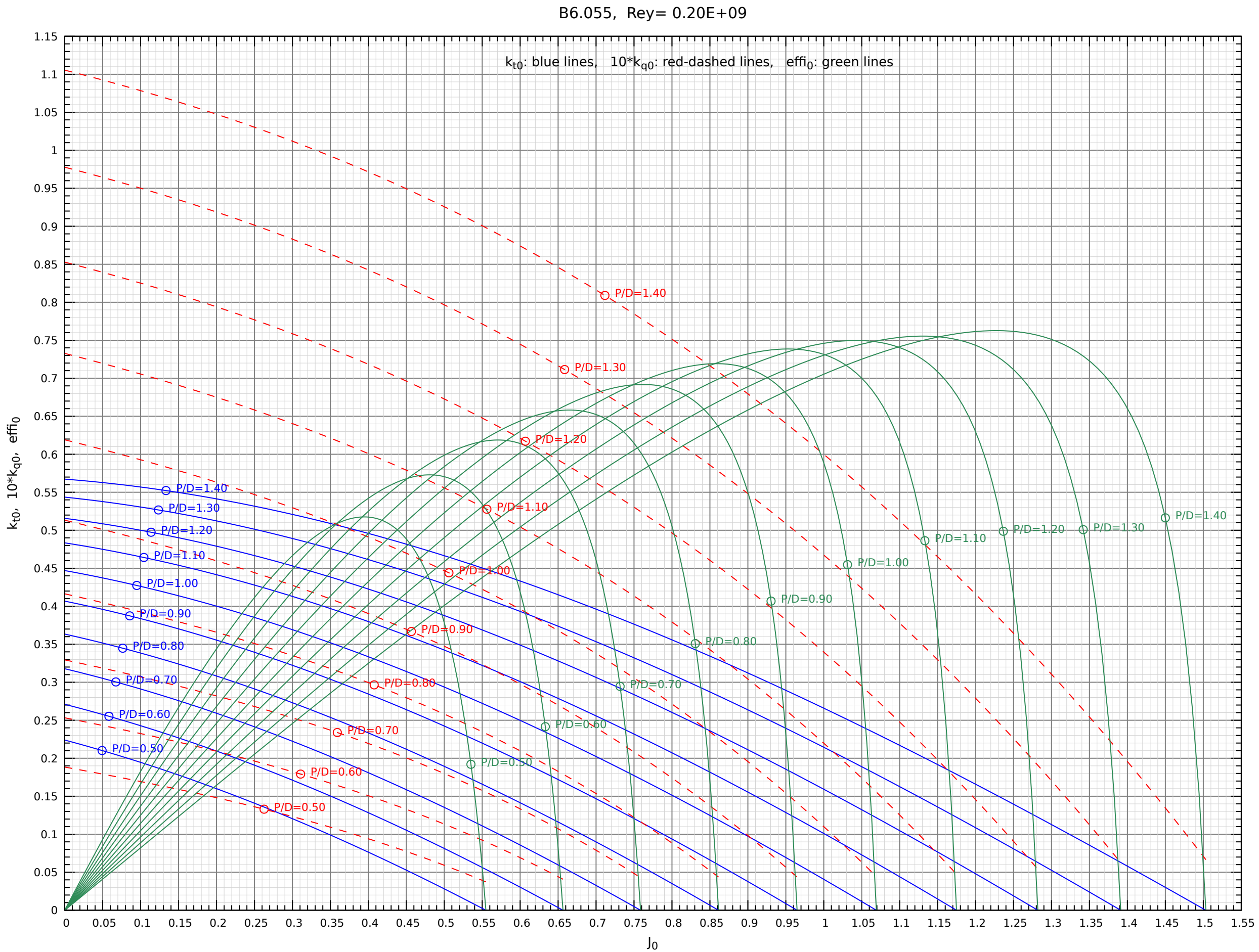
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0

B6.055, Rey= 0.20E+08




B6.055, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.90
P/D=0.80
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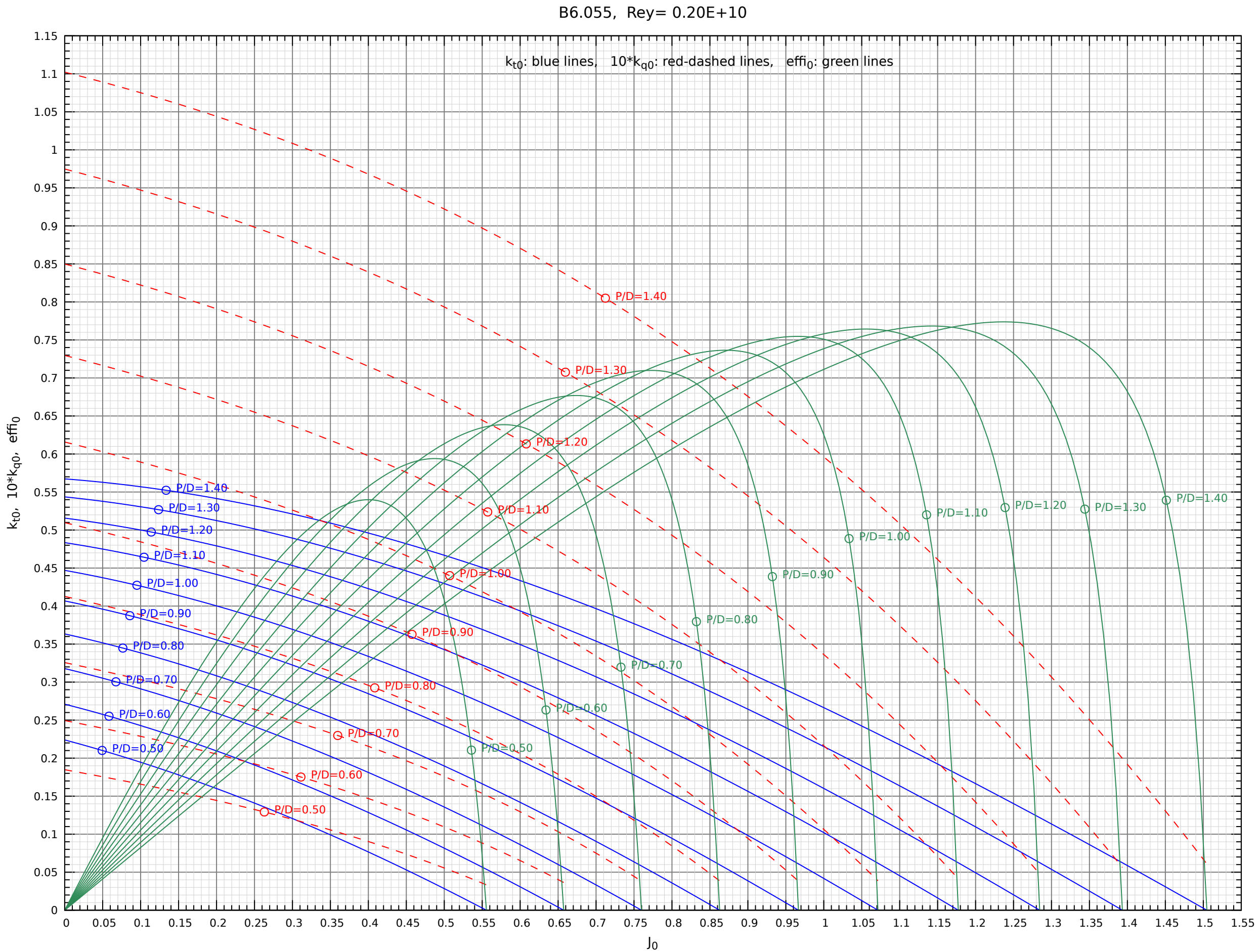
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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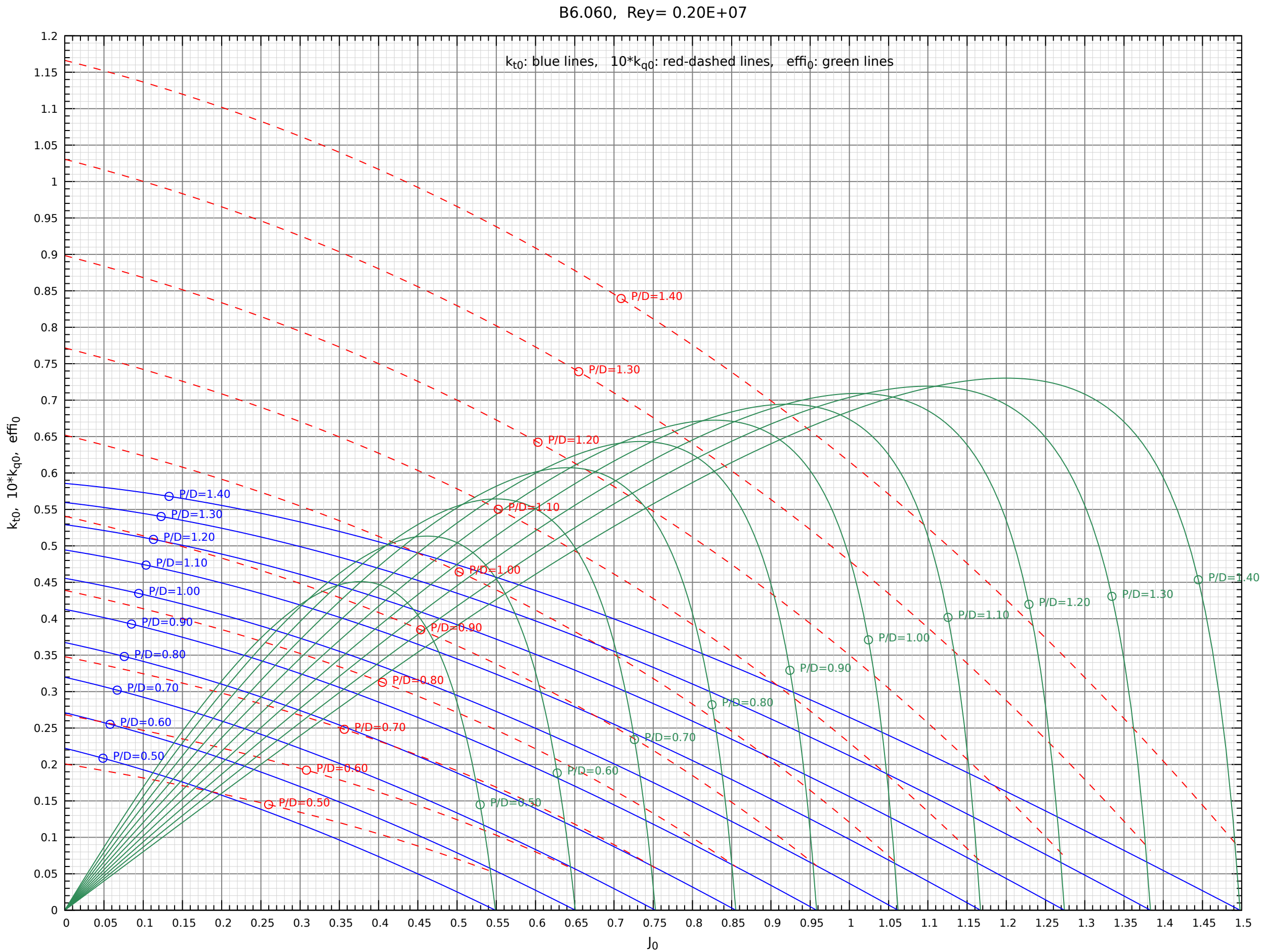
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.060, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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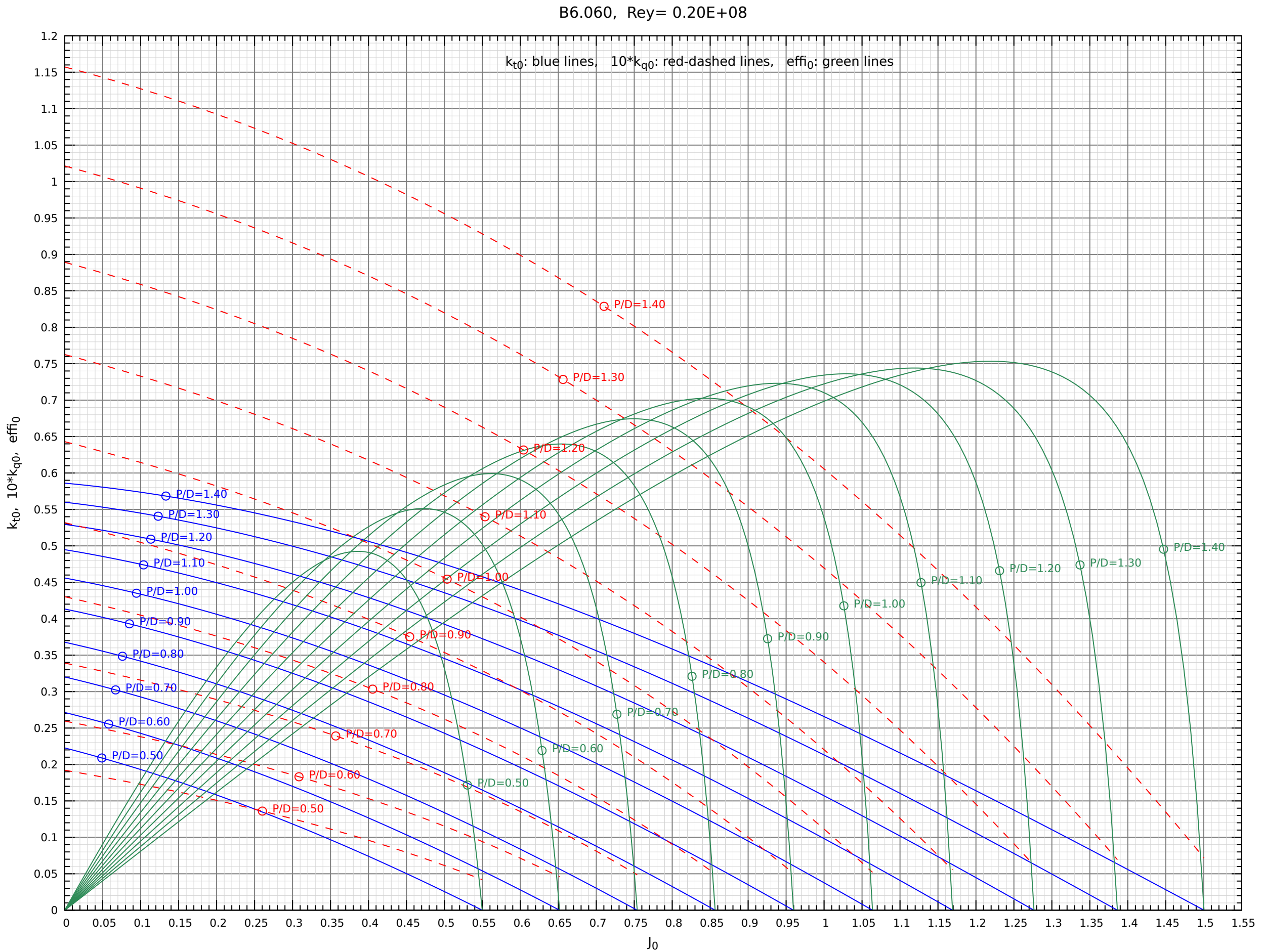
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.060, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.60
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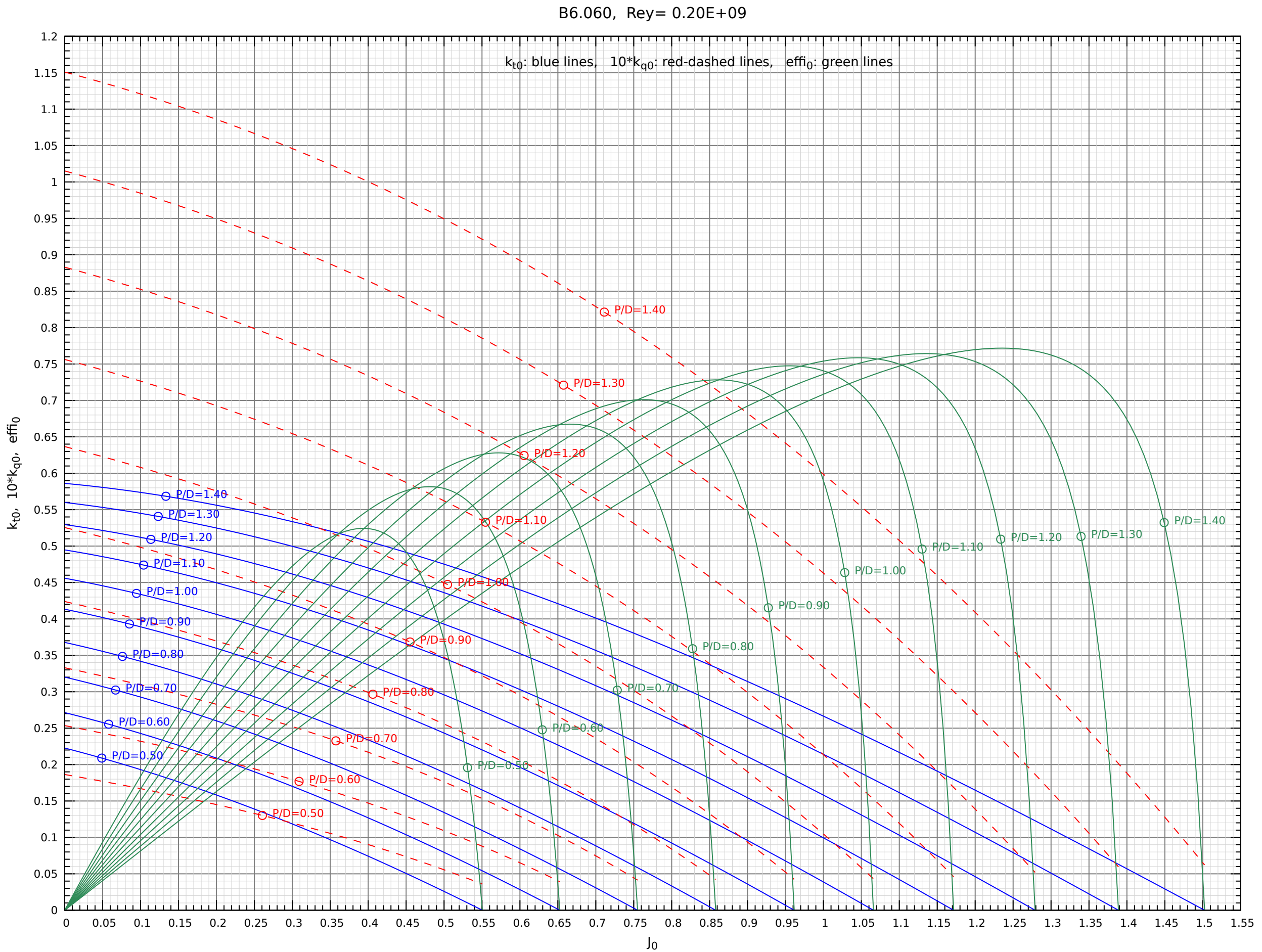
B6.060, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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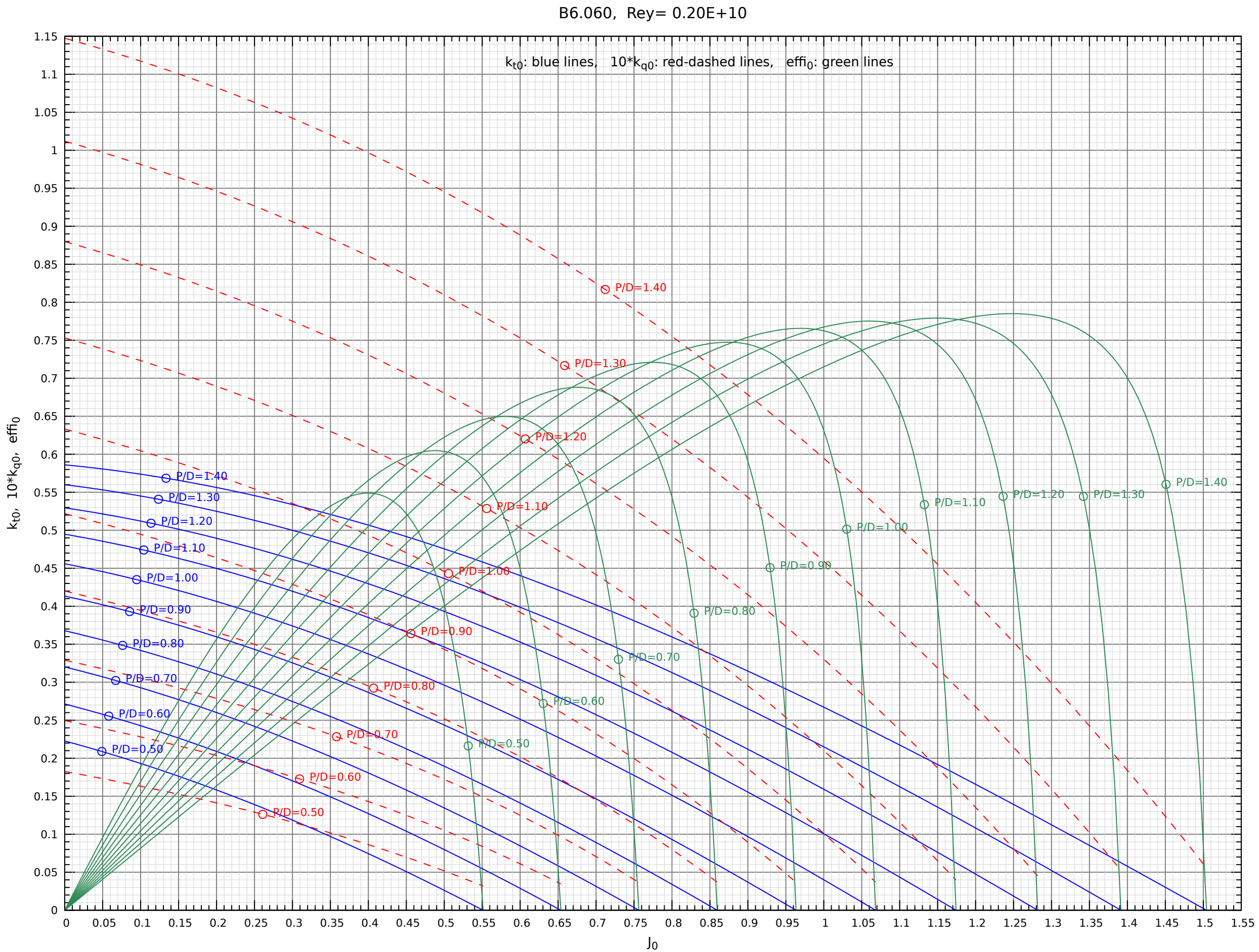
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.060, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
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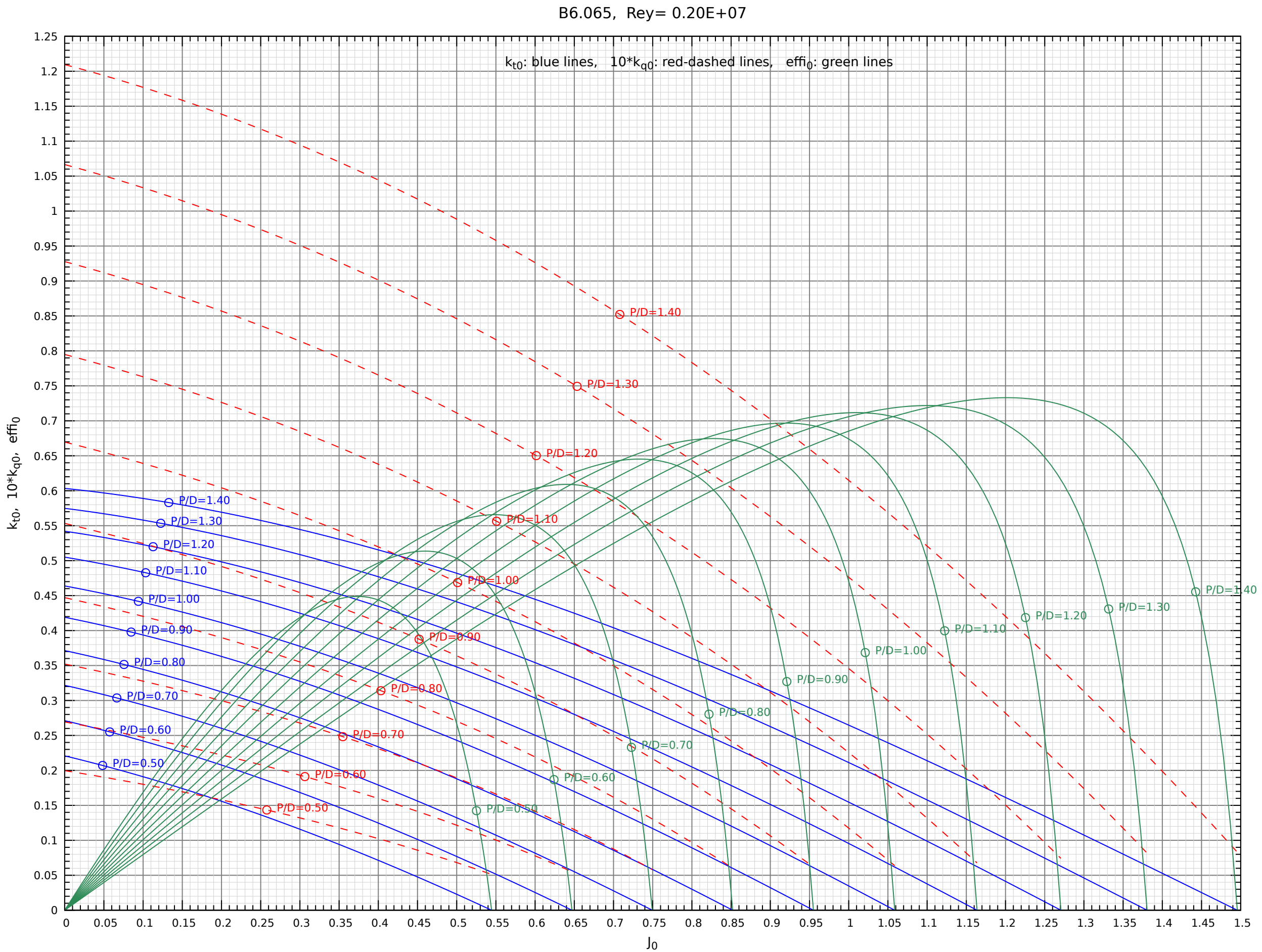
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0


B6.065, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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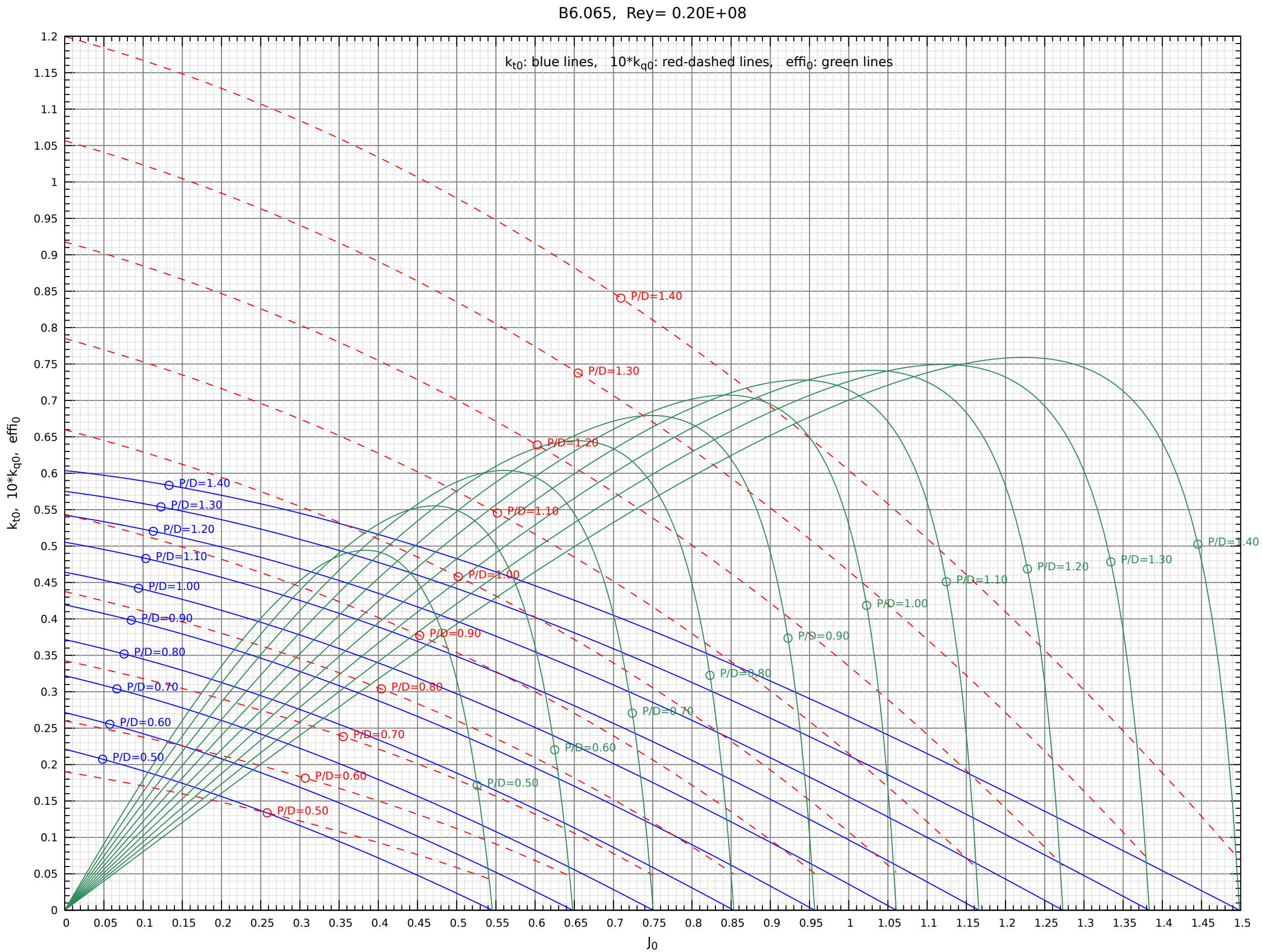
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.065, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
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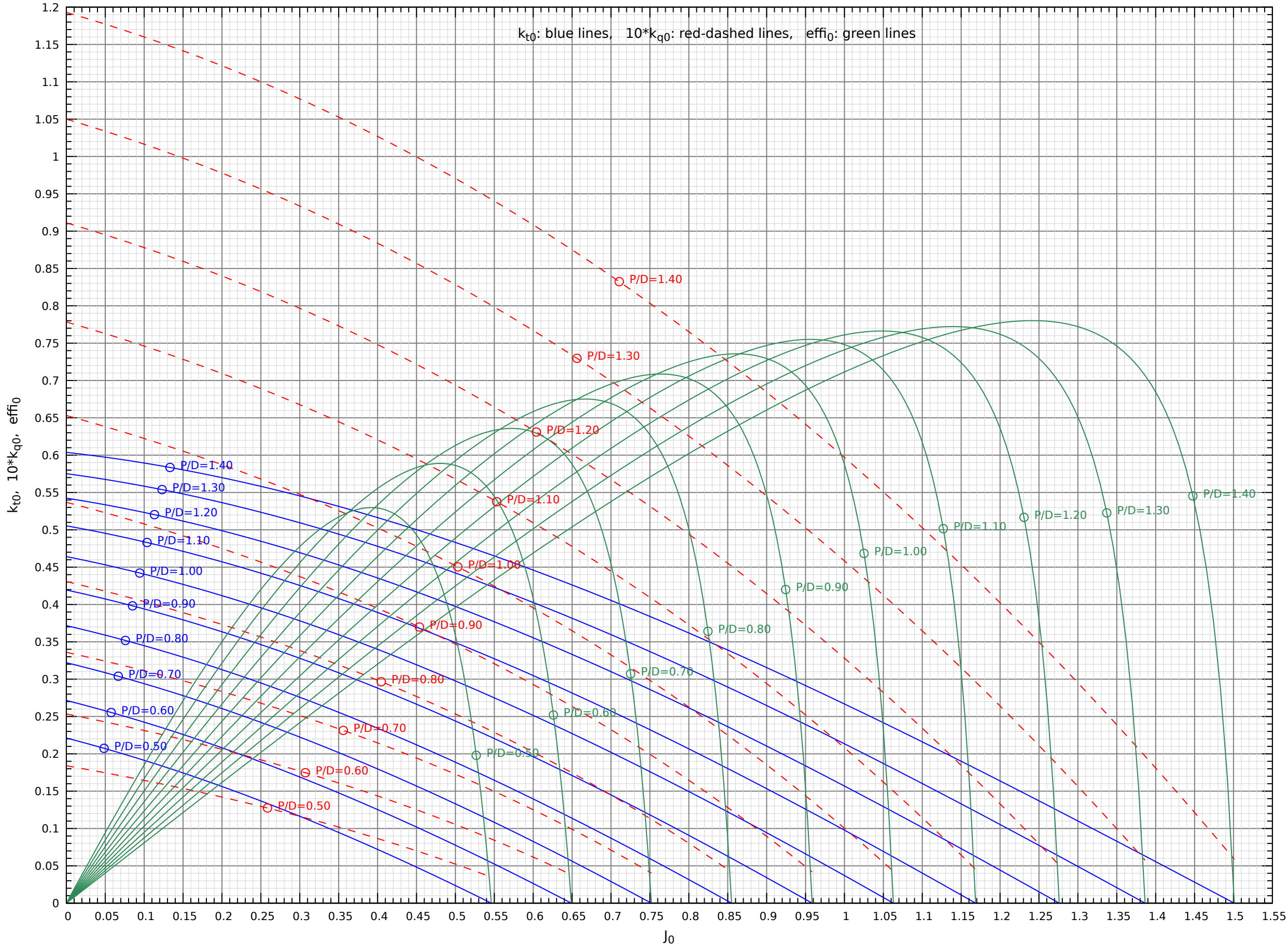
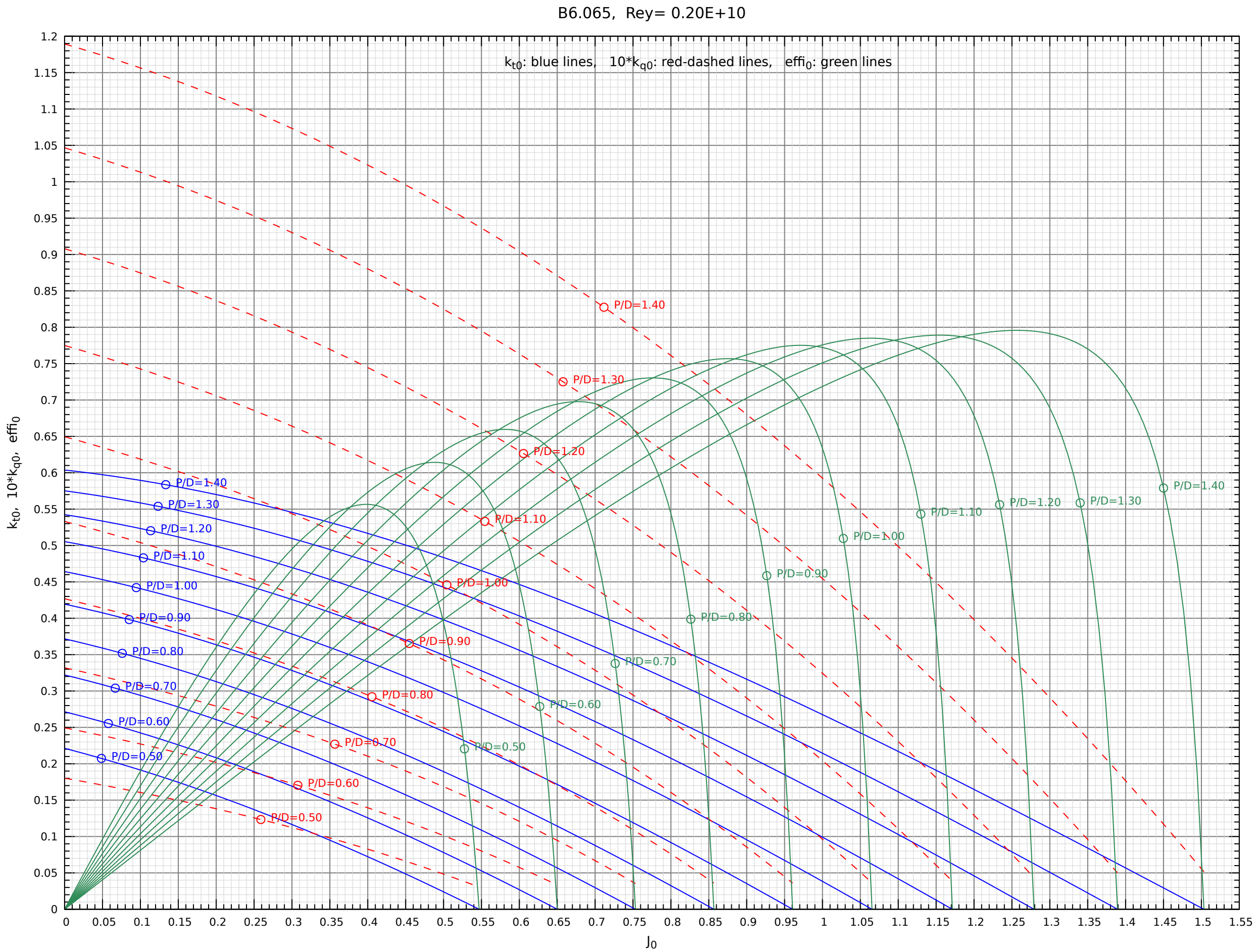
P/D=0.70
P/D=0.60
P/D=0.50

B6.065, Rey= 0.20E+09




B6.065, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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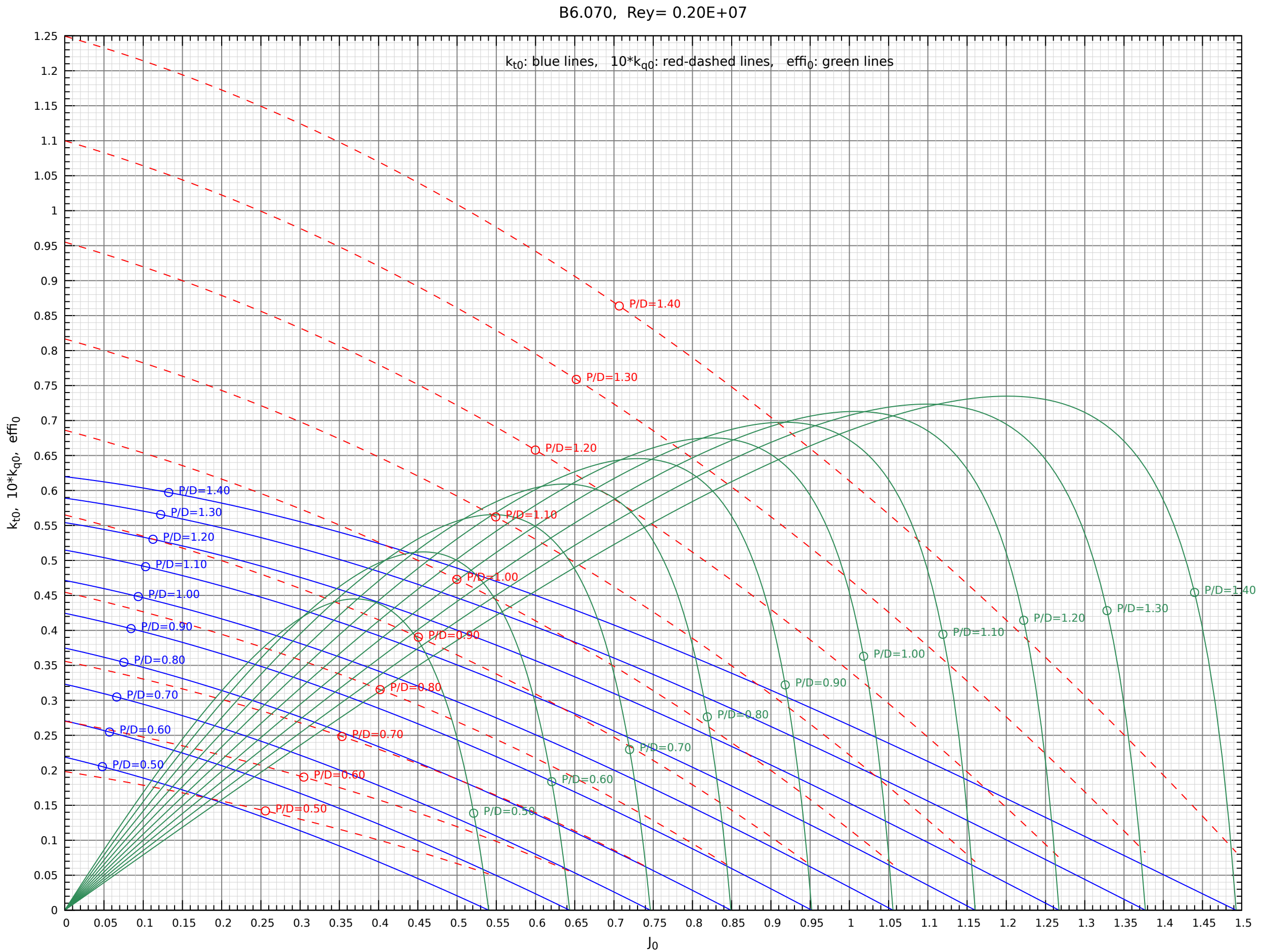
P/D=0.60
P/D=0.50


B6.070, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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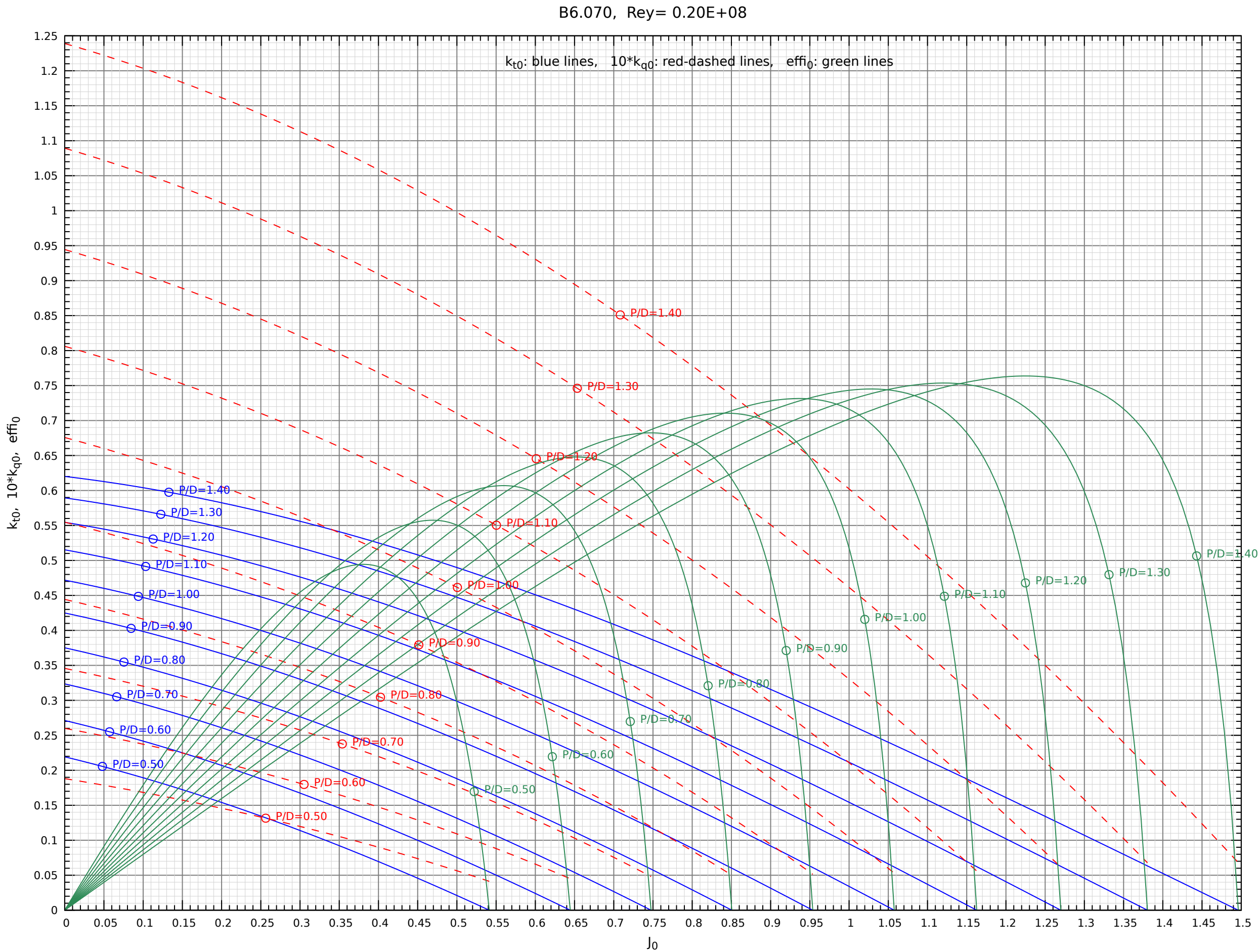
P/D=0.60
P/D=0.50


B6.070, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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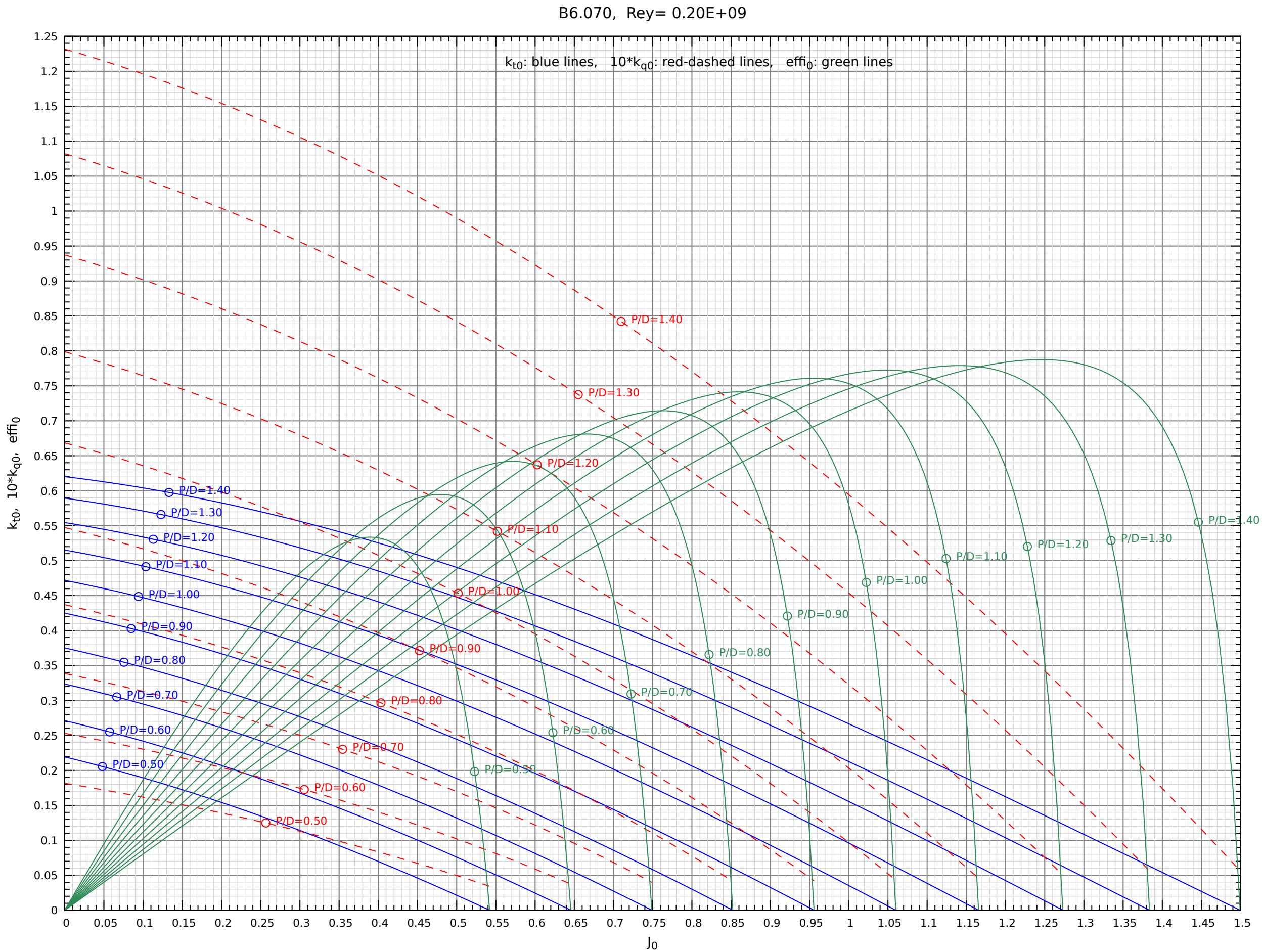
P/D=0.60
P/D=0.50


B6.070, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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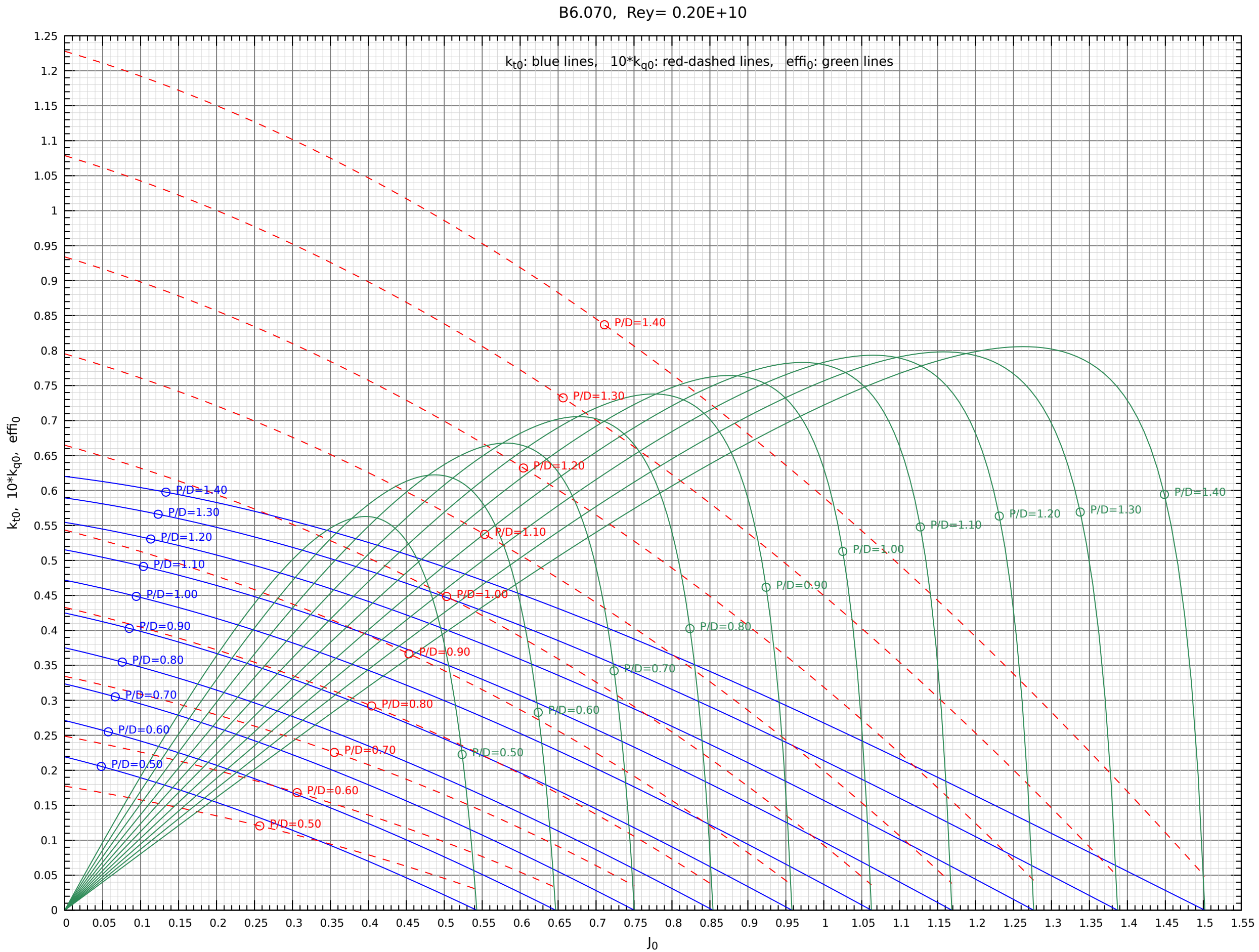
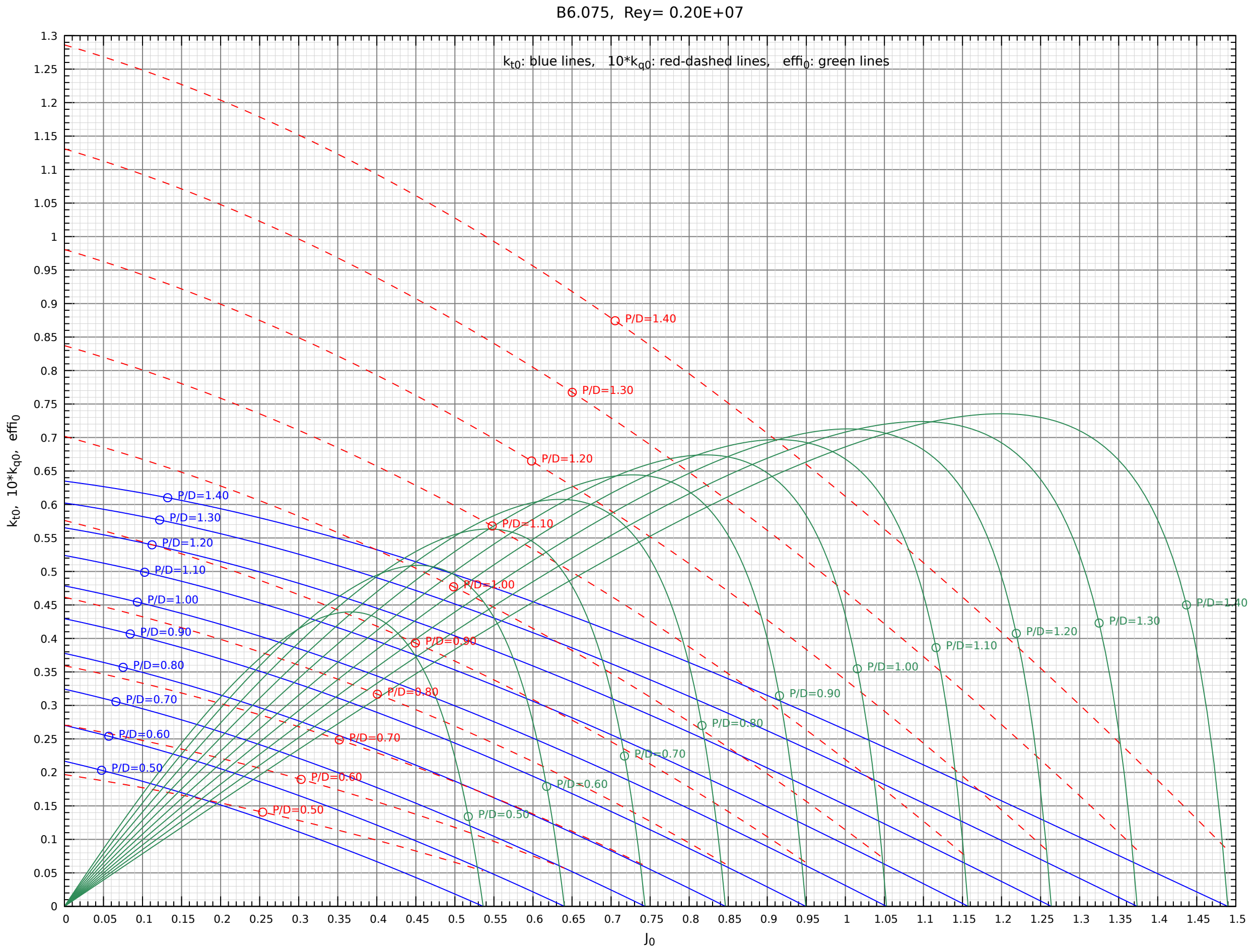
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.070, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B6.075, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
P/D=0.70
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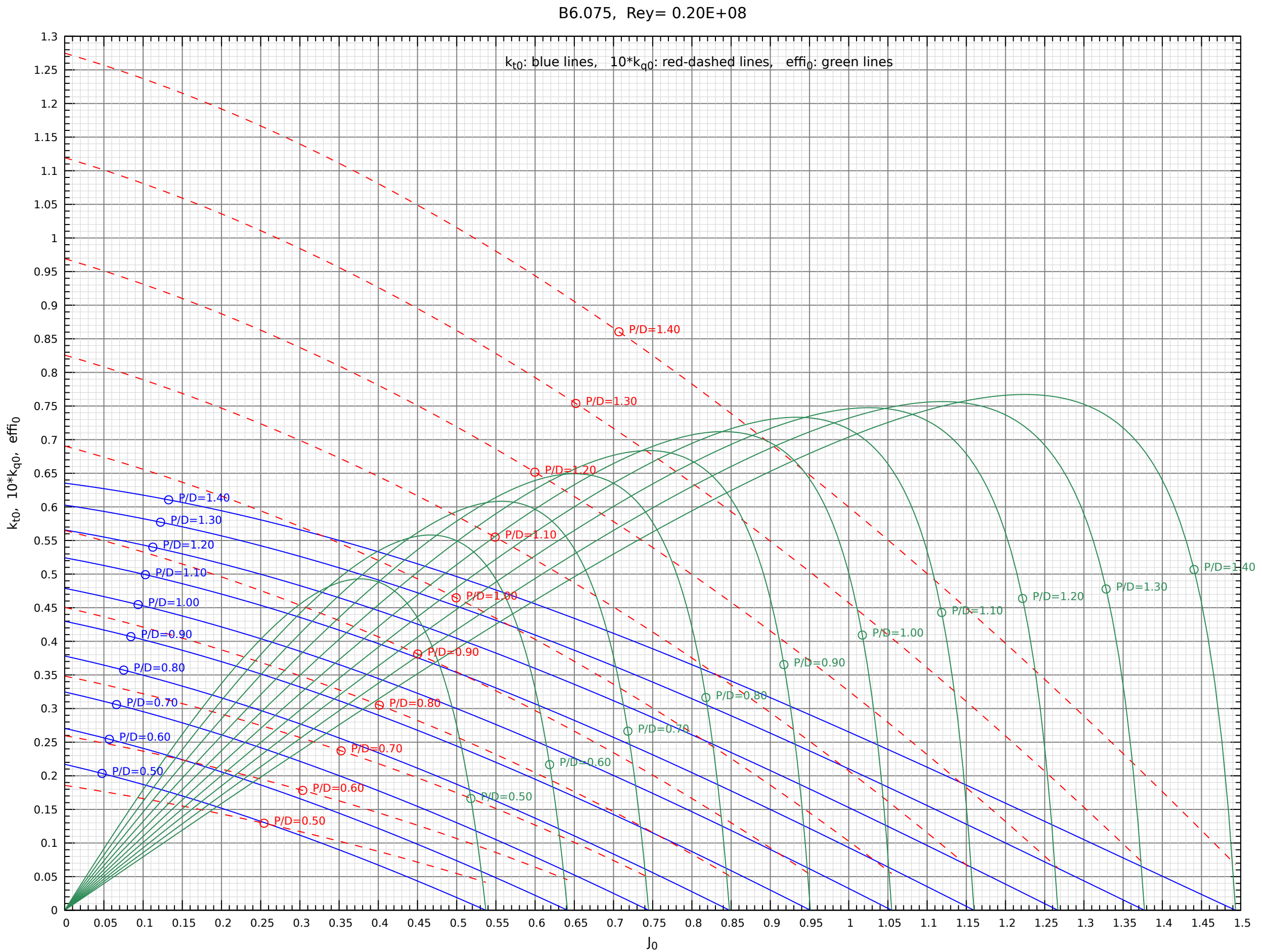
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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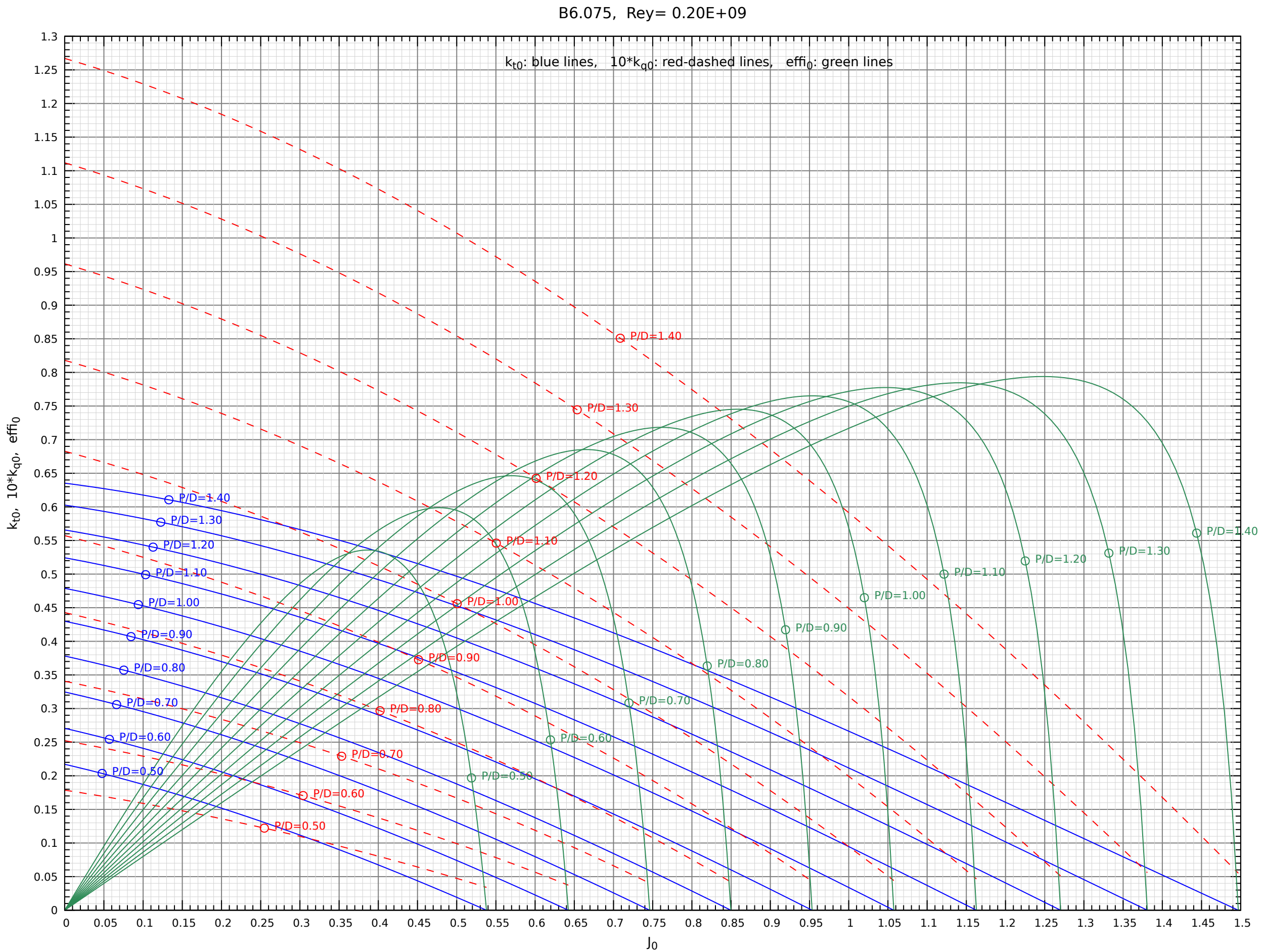
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.30
P/D=1.20
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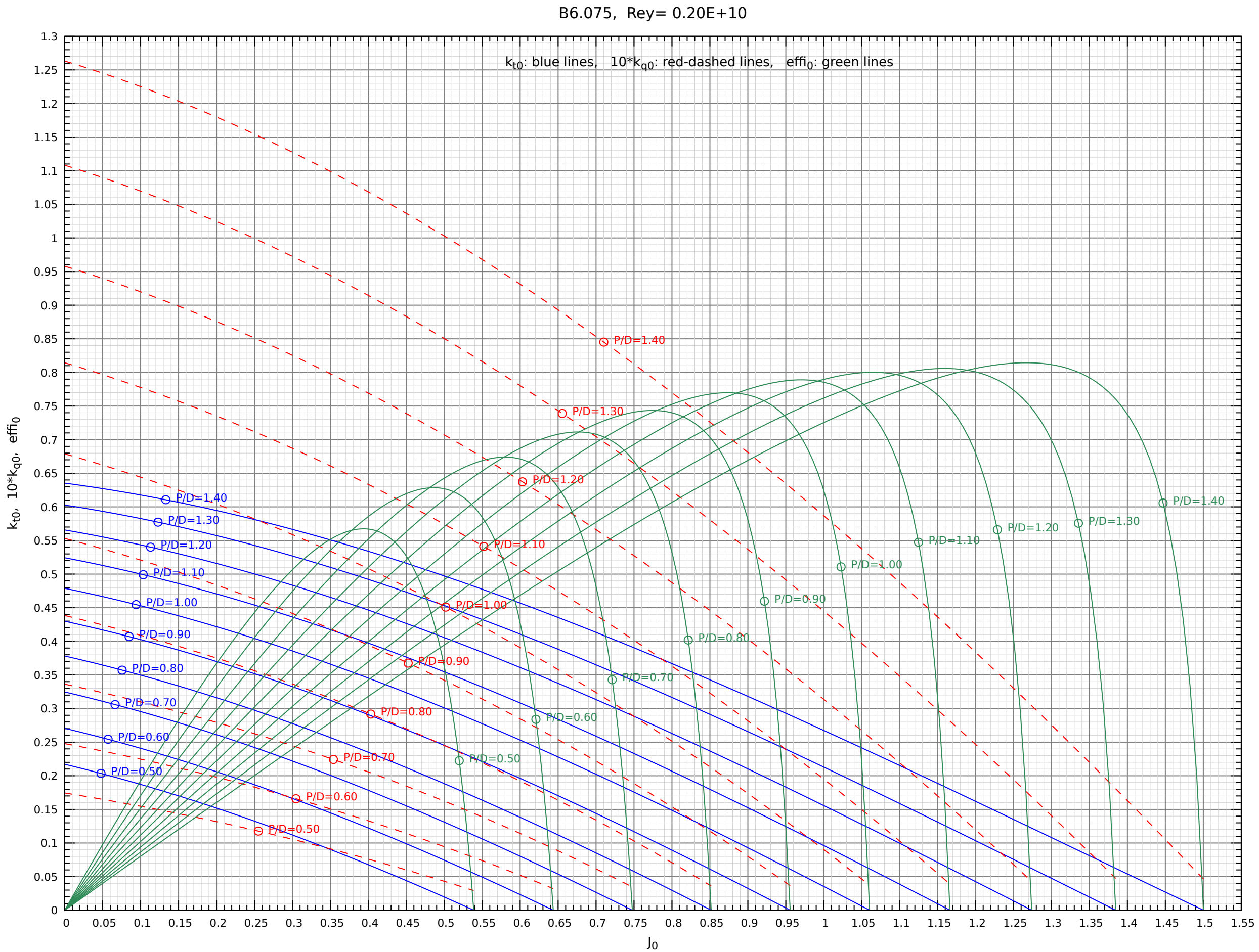
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
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P/D=1.30
P/D=1.20
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P/D=0.80
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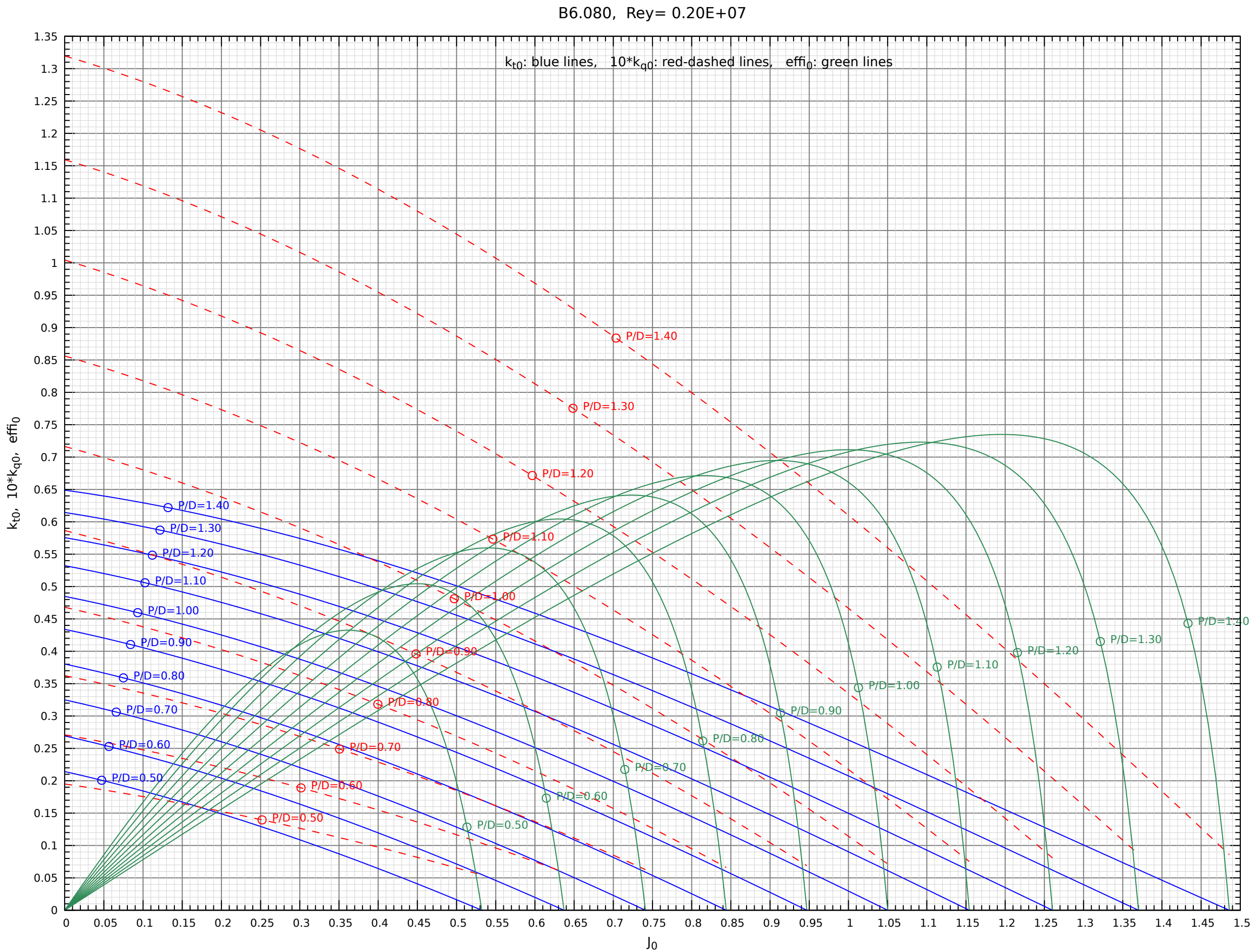
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
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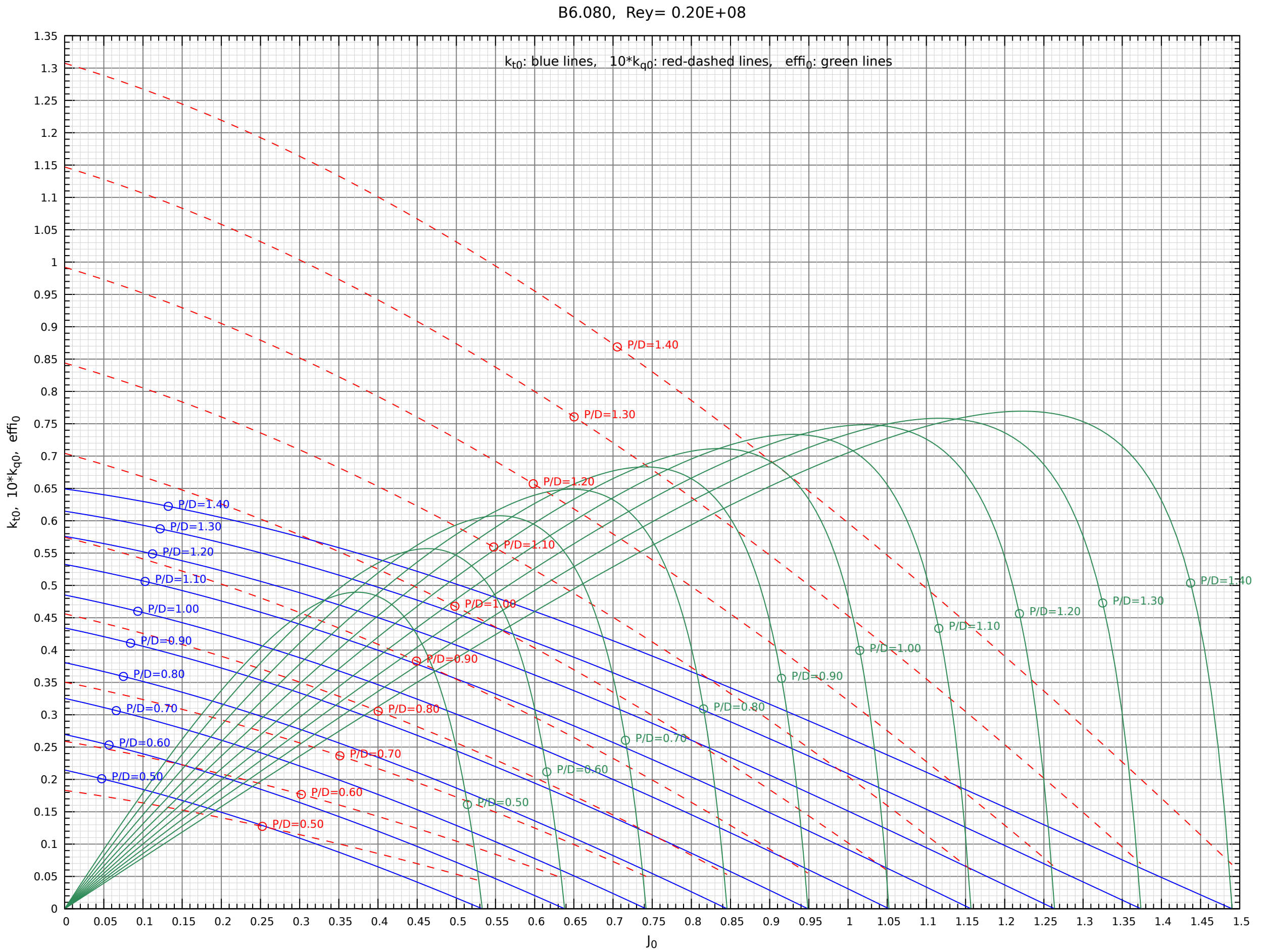
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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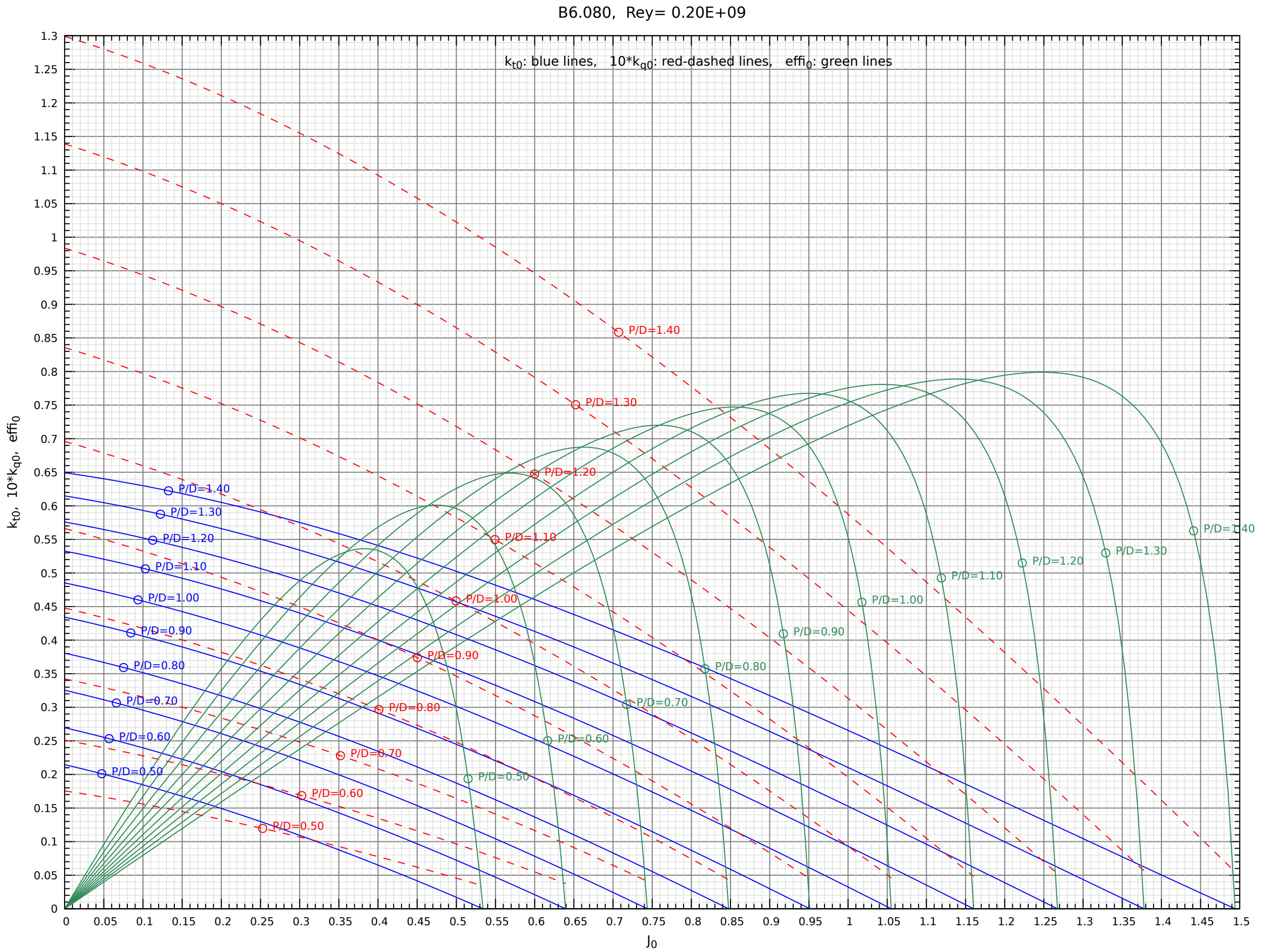
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
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P/D=1.20
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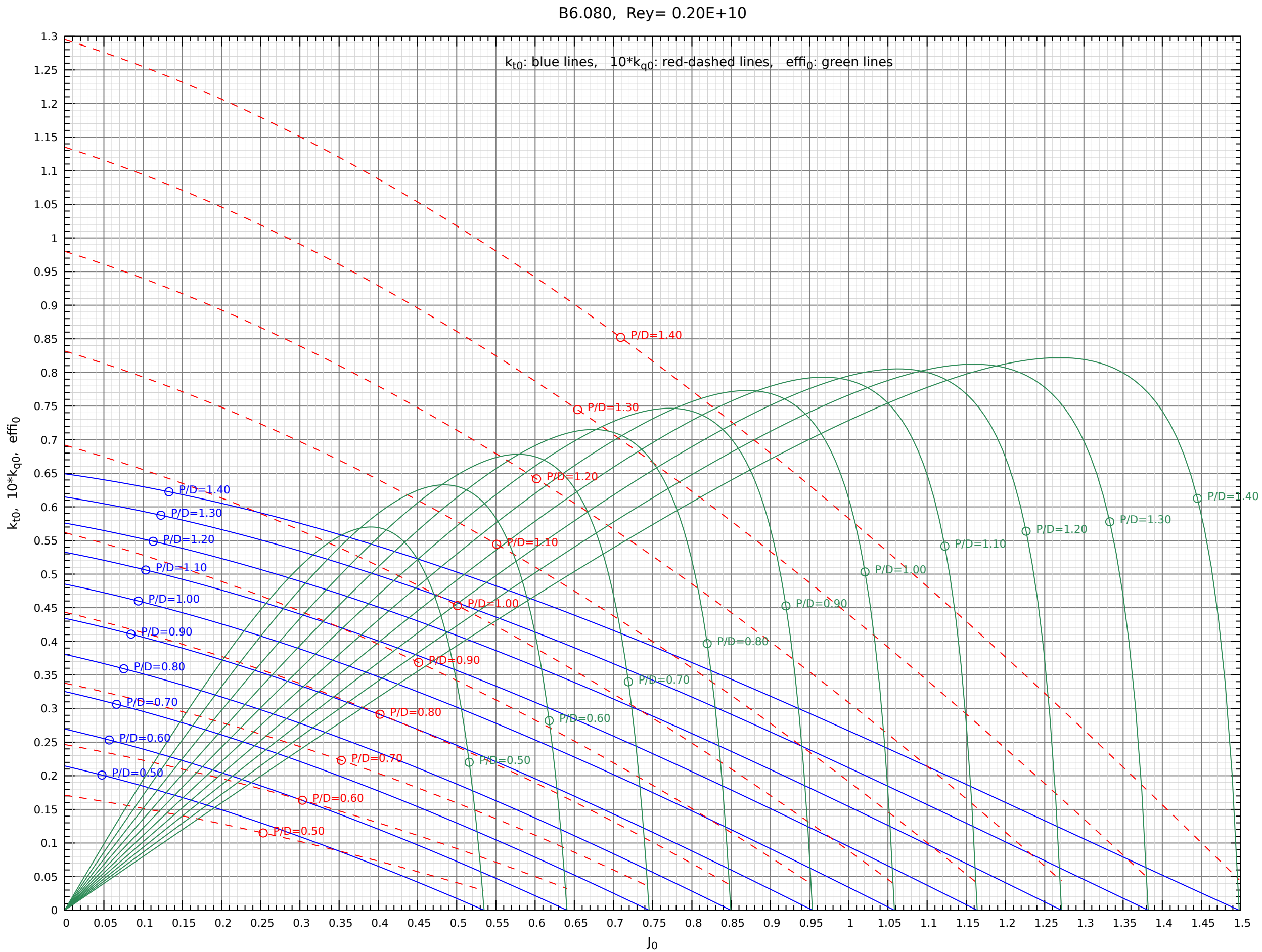
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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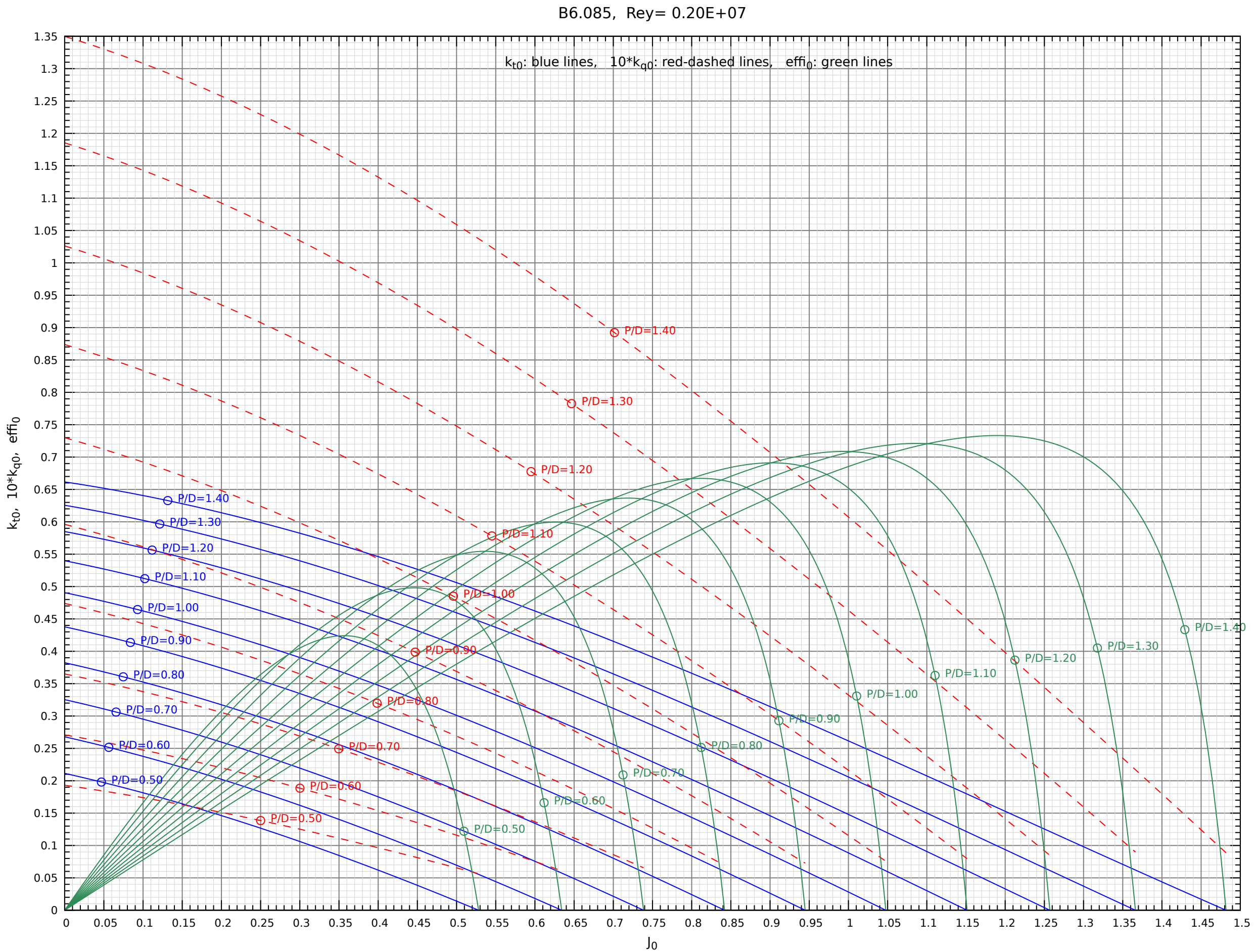
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
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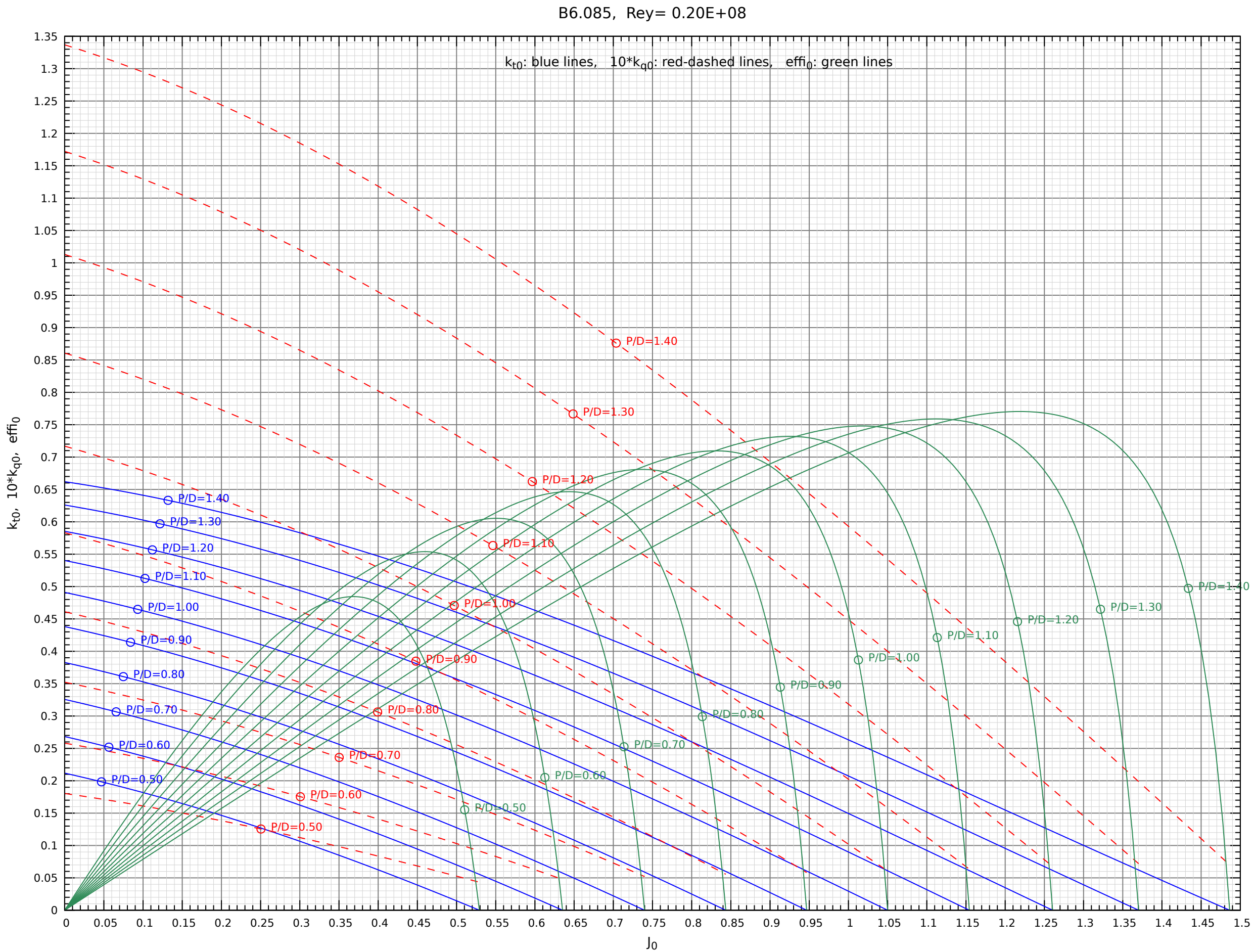
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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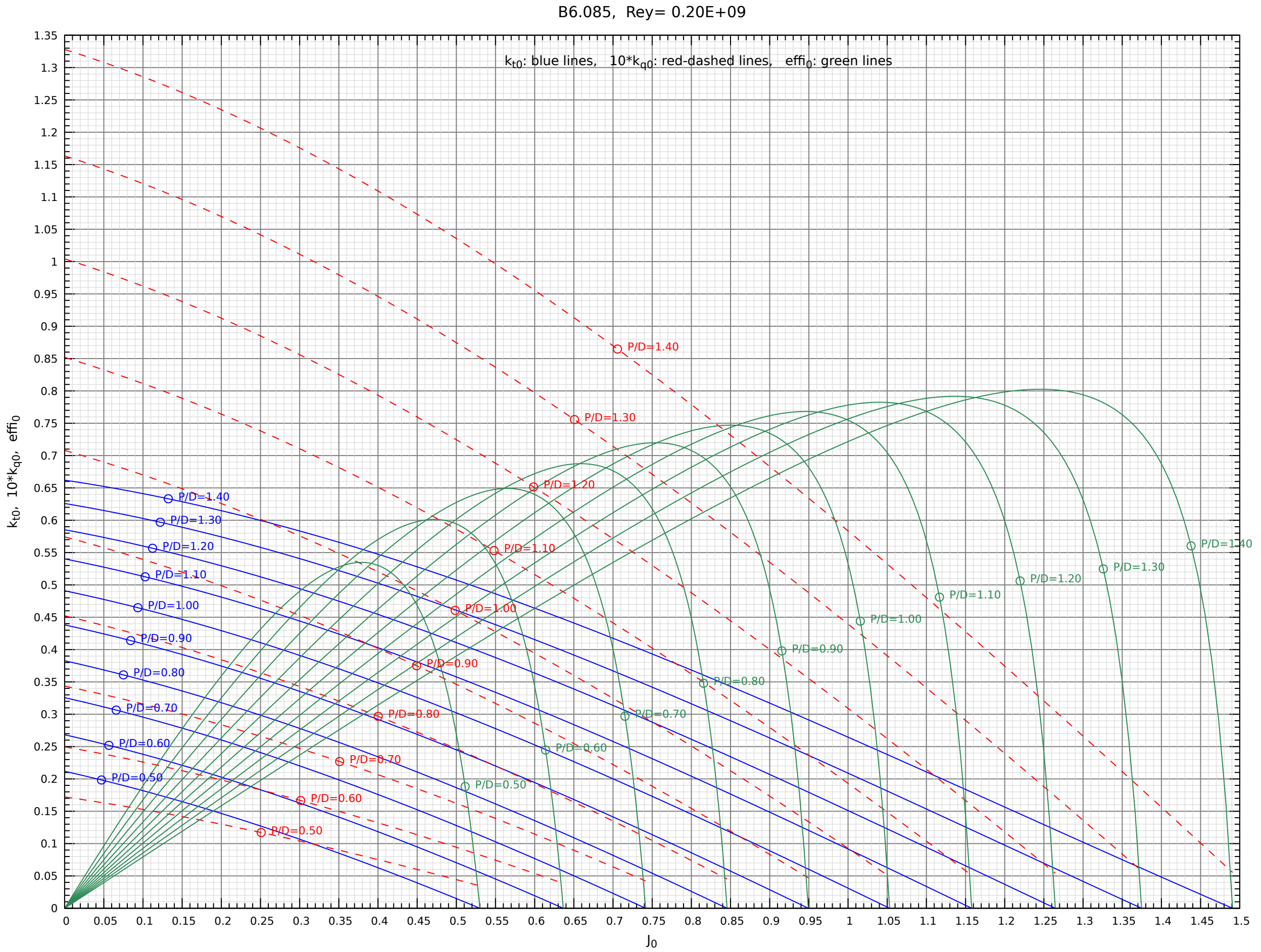
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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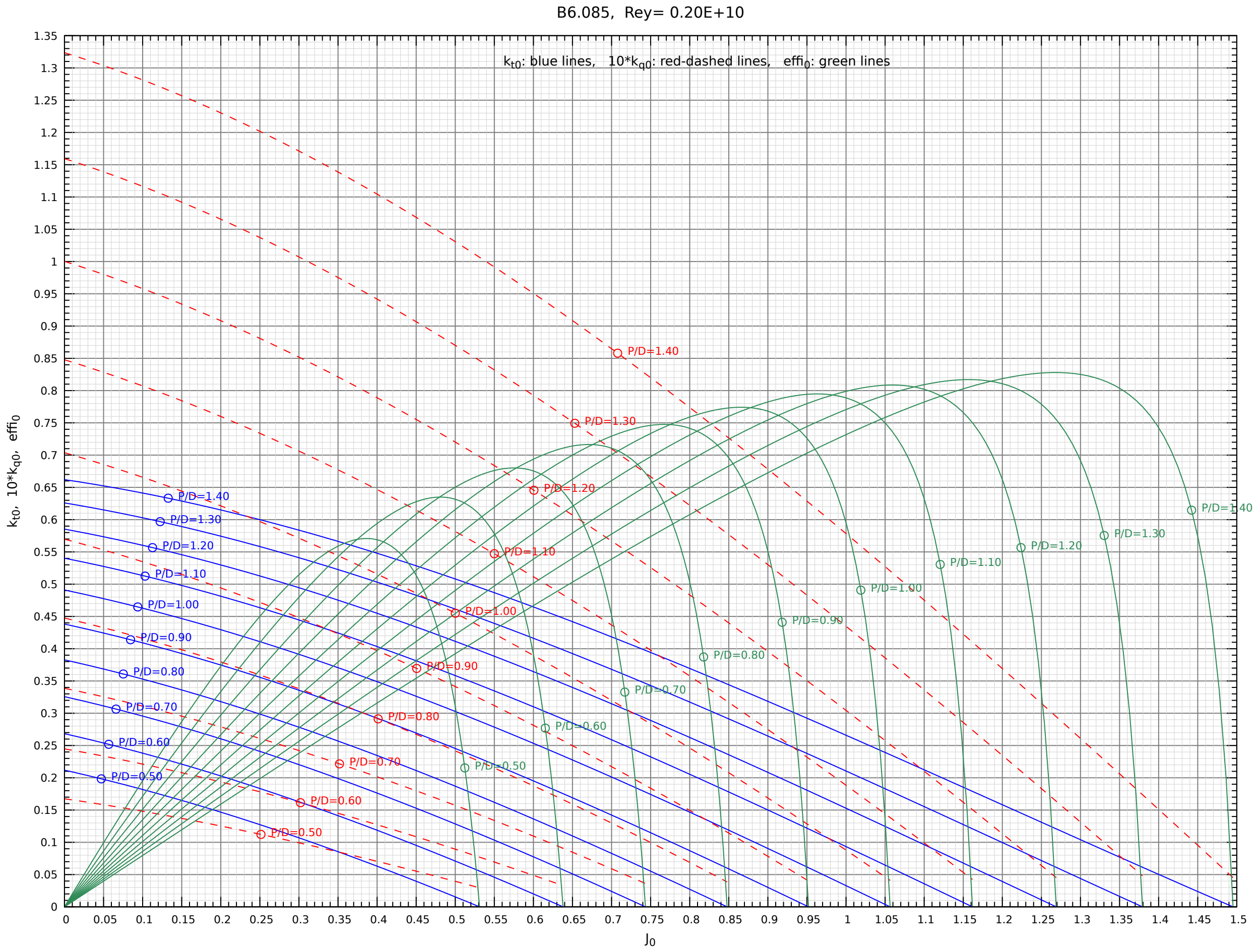
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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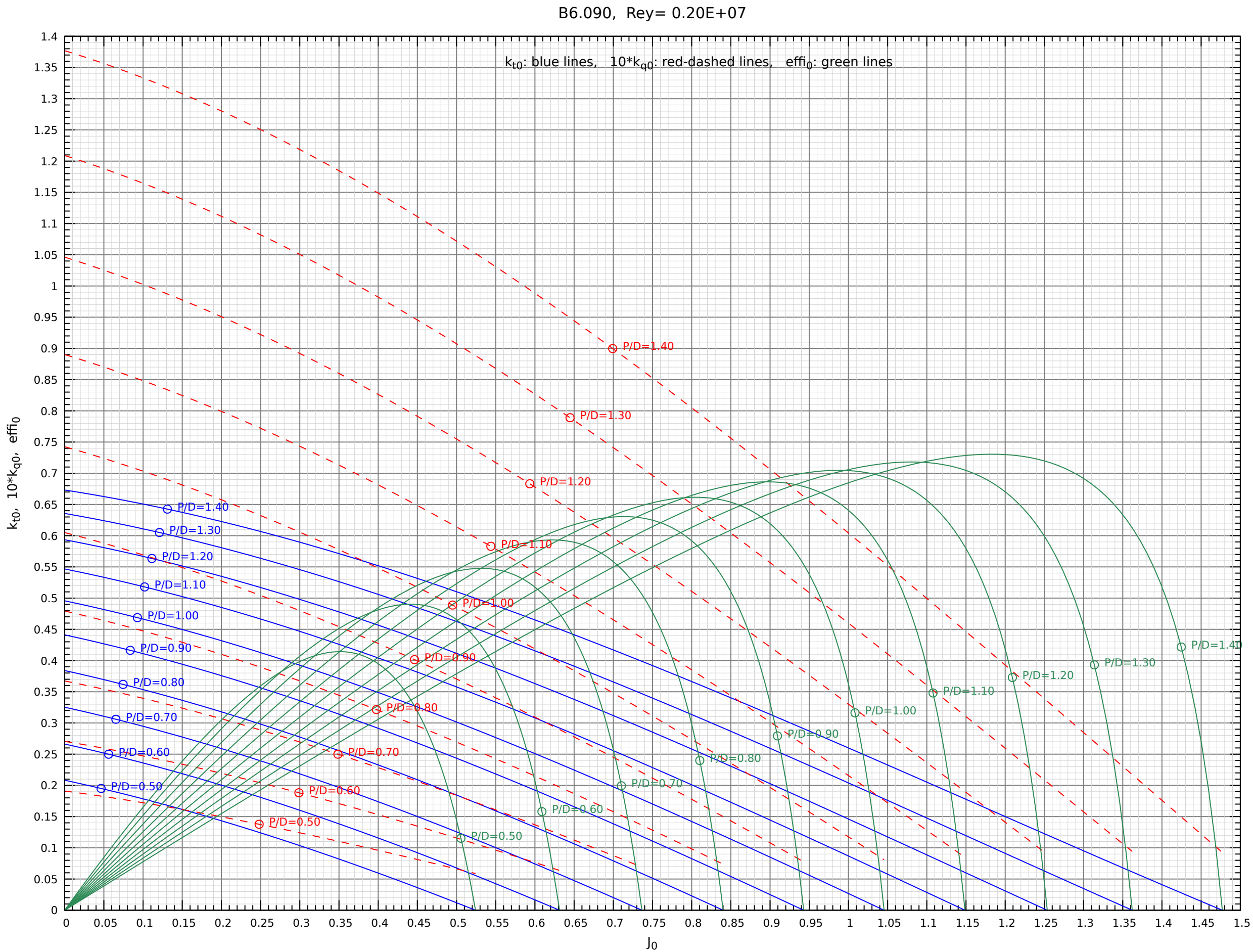
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P/D=1.40
P/D=1.30
P/D=1.20
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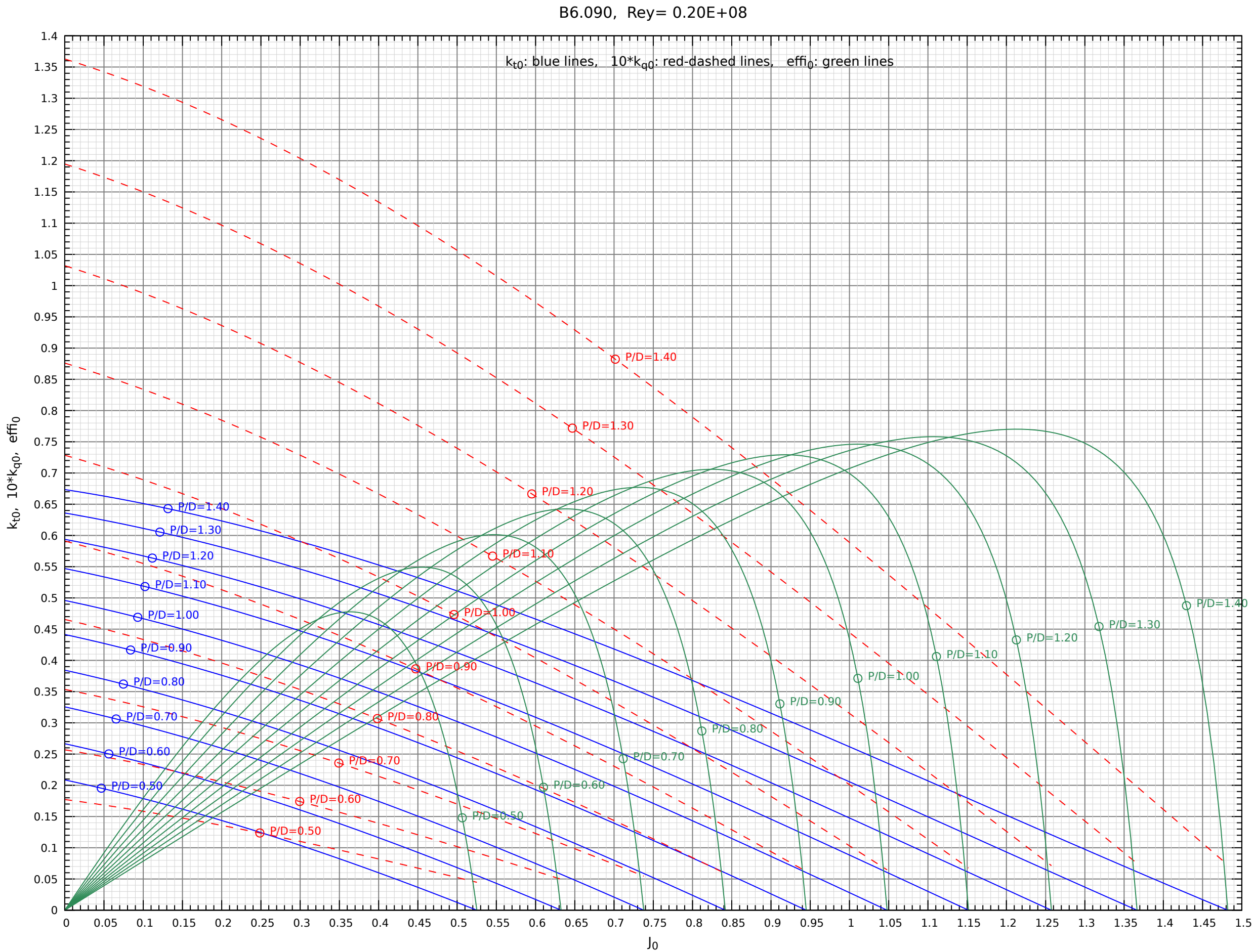
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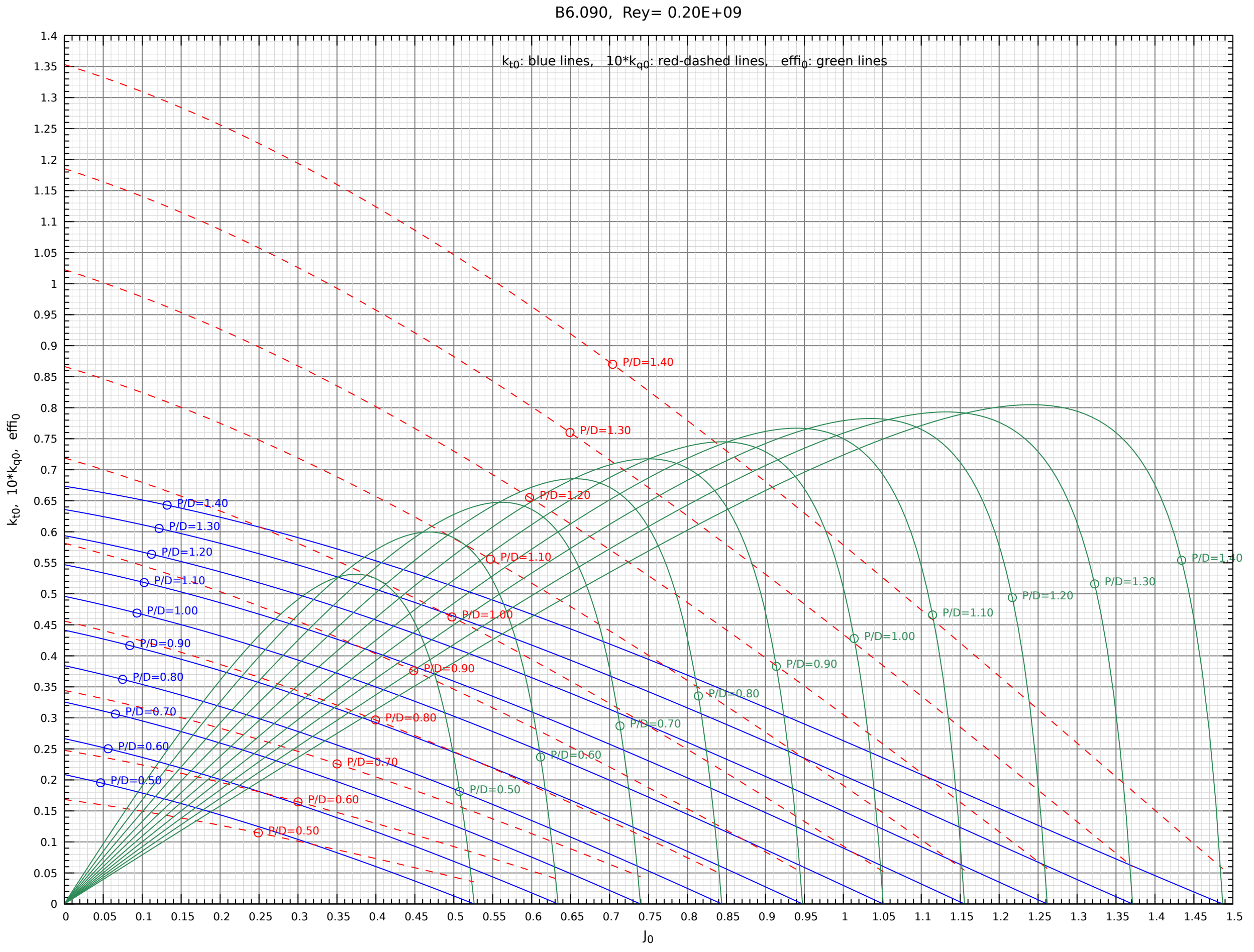
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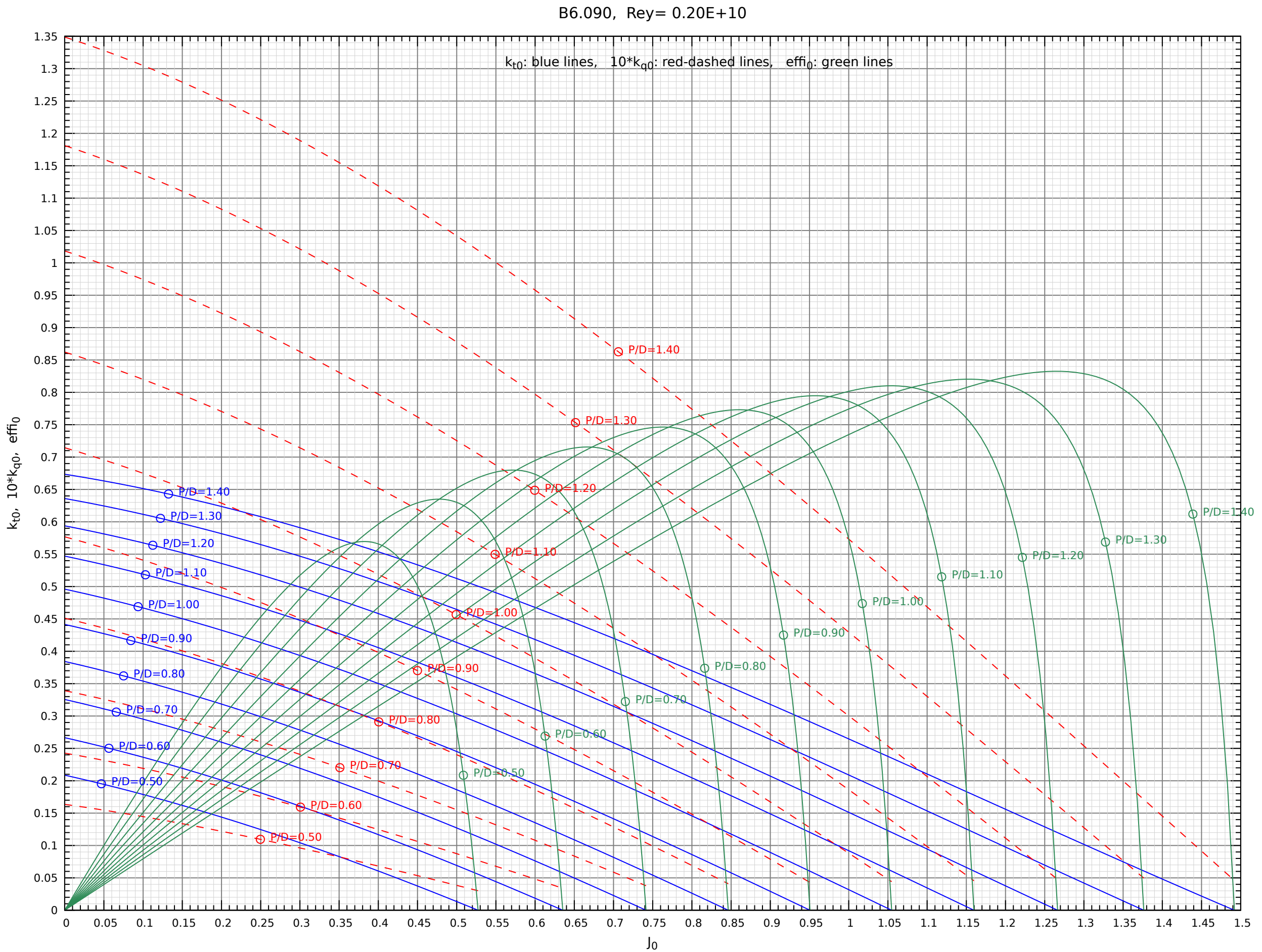
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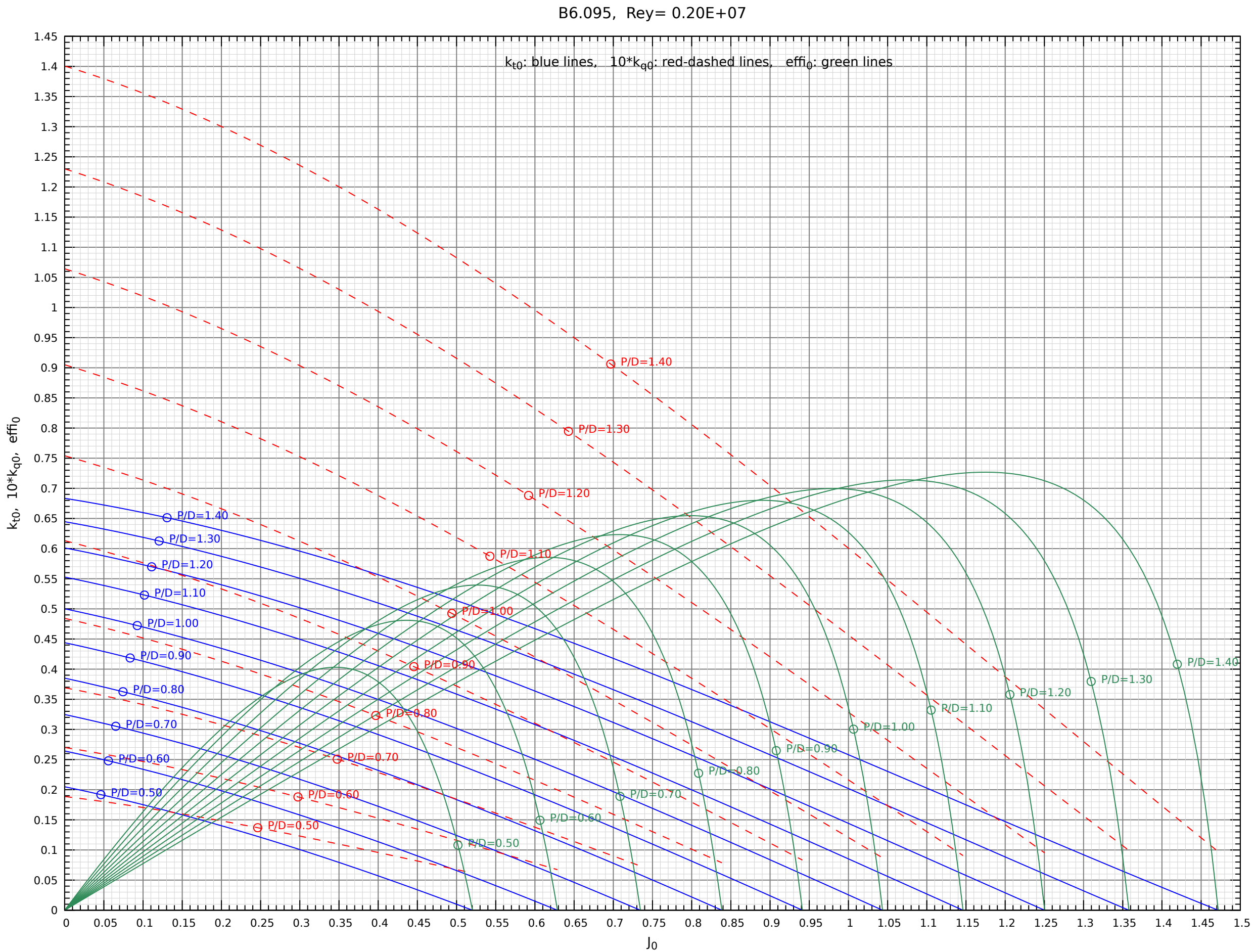
B6.095, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
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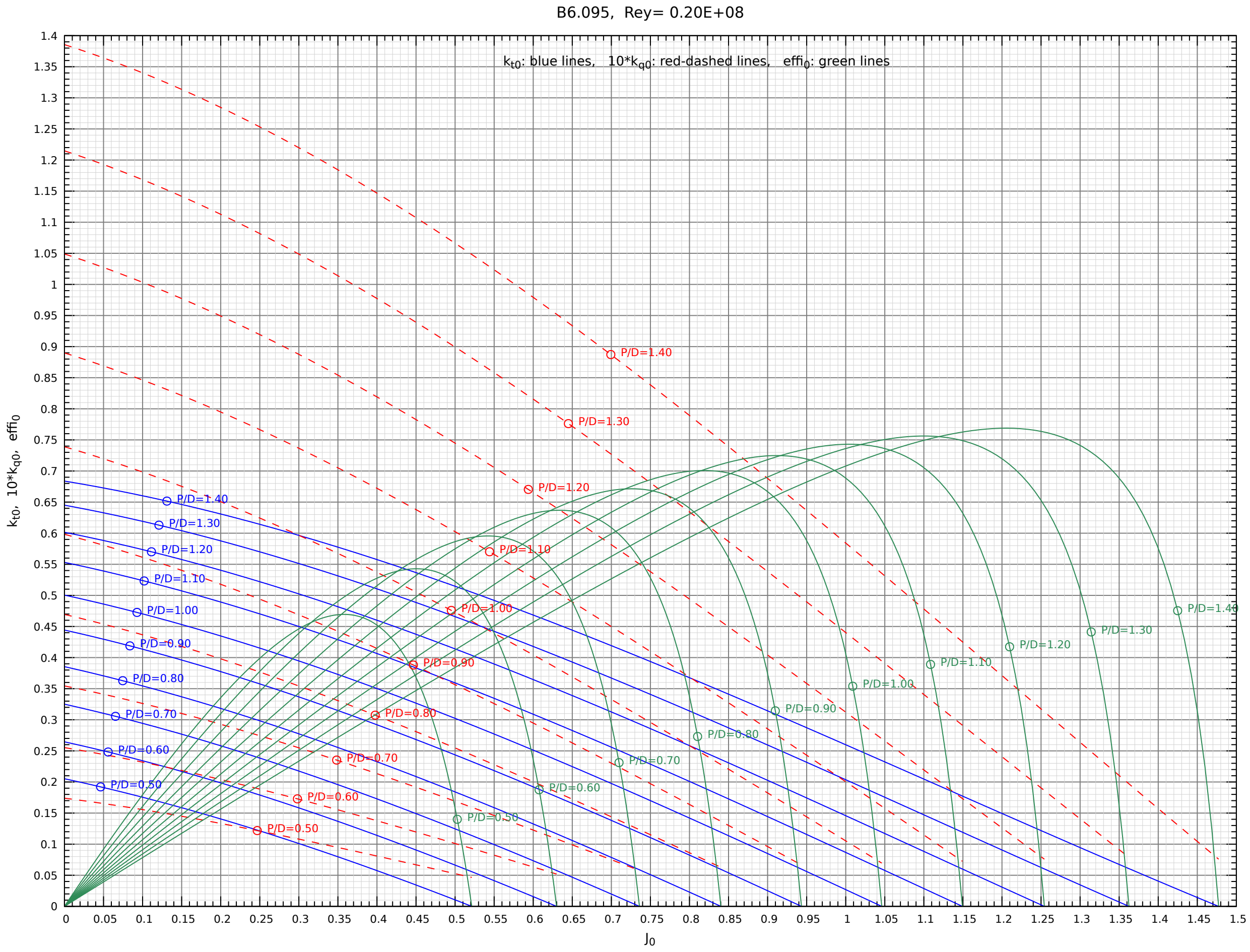
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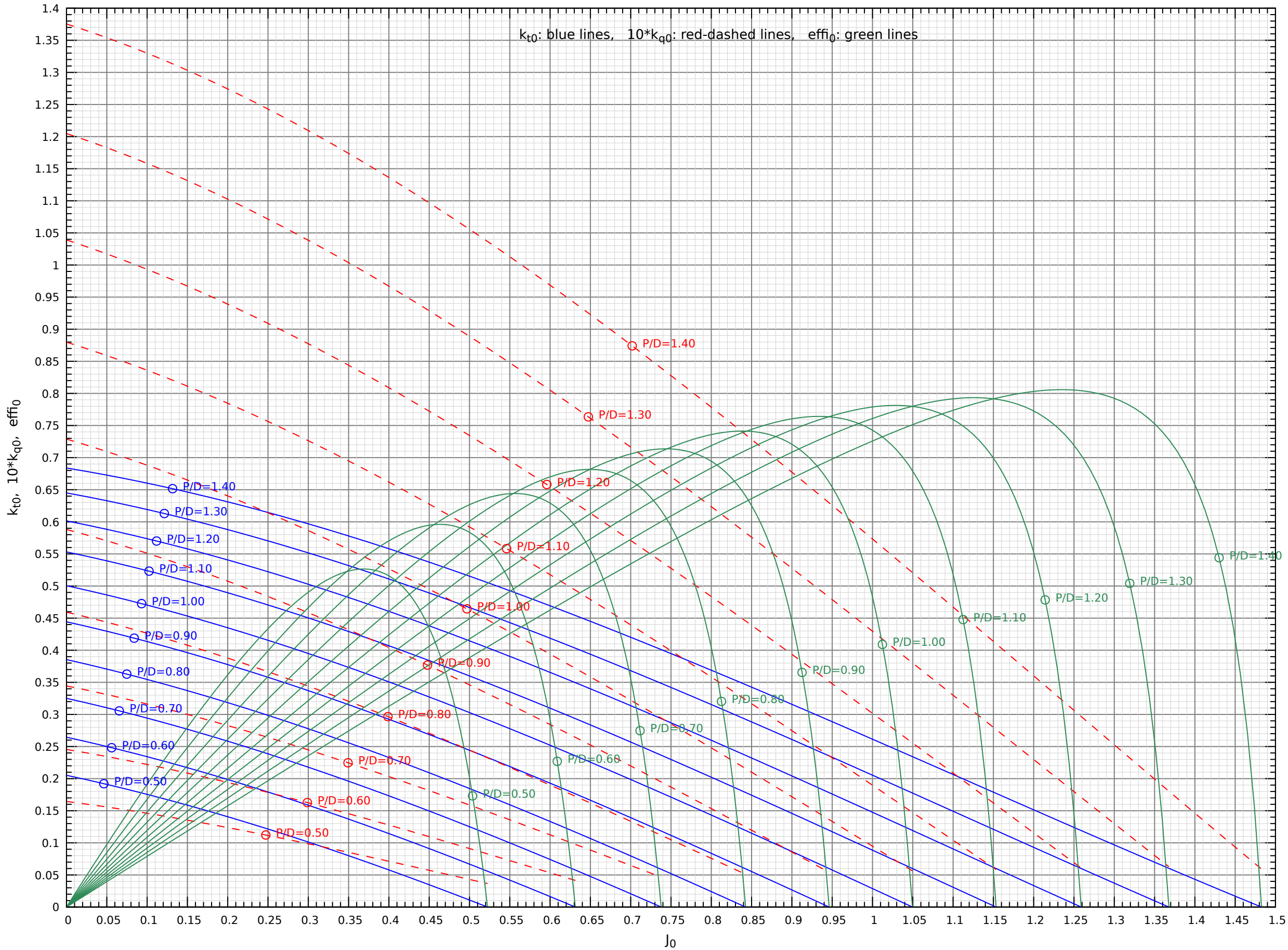

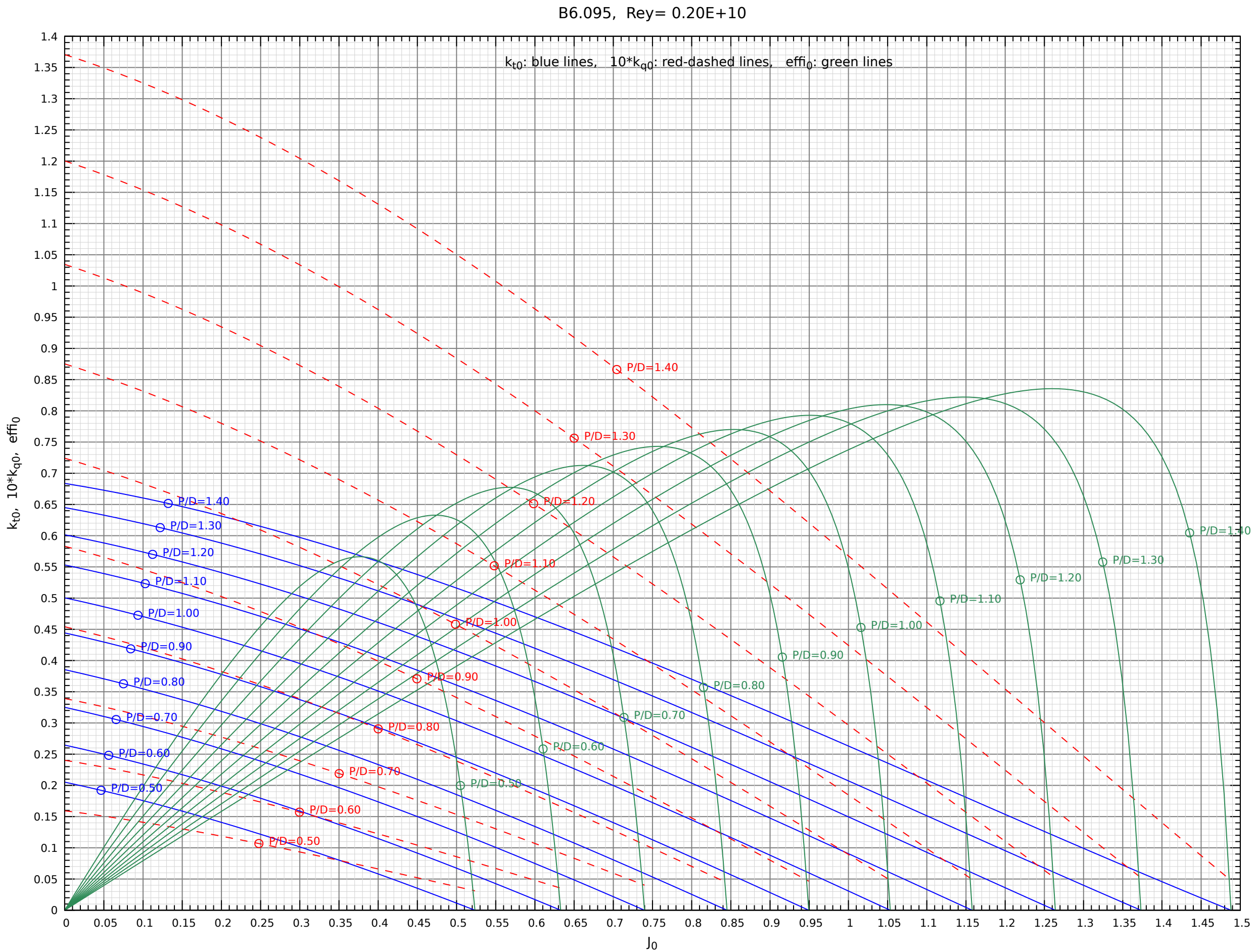
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
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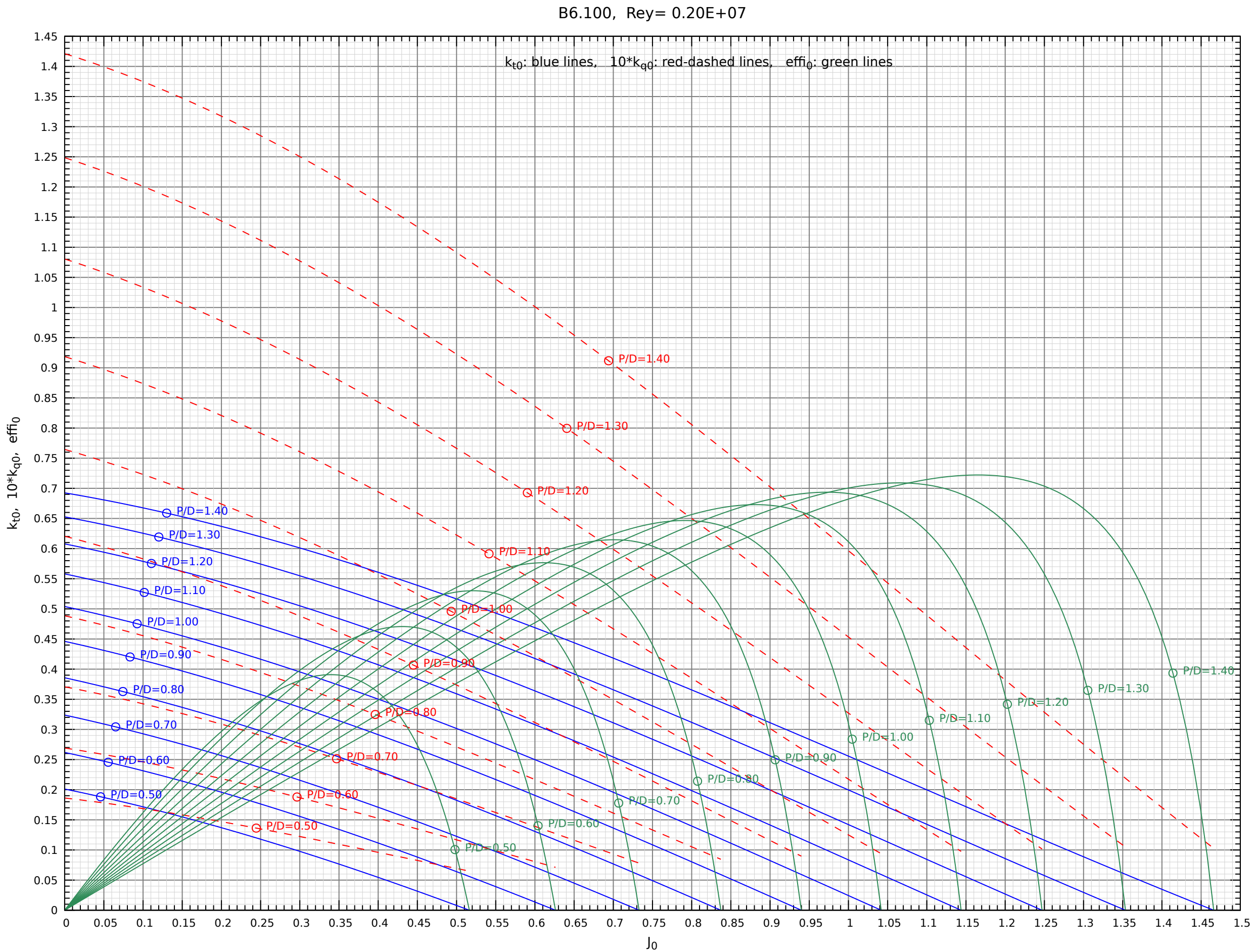
B6.100, Rey= 0.20E+07
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J_0
P/D=1.40
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P/D=1.20
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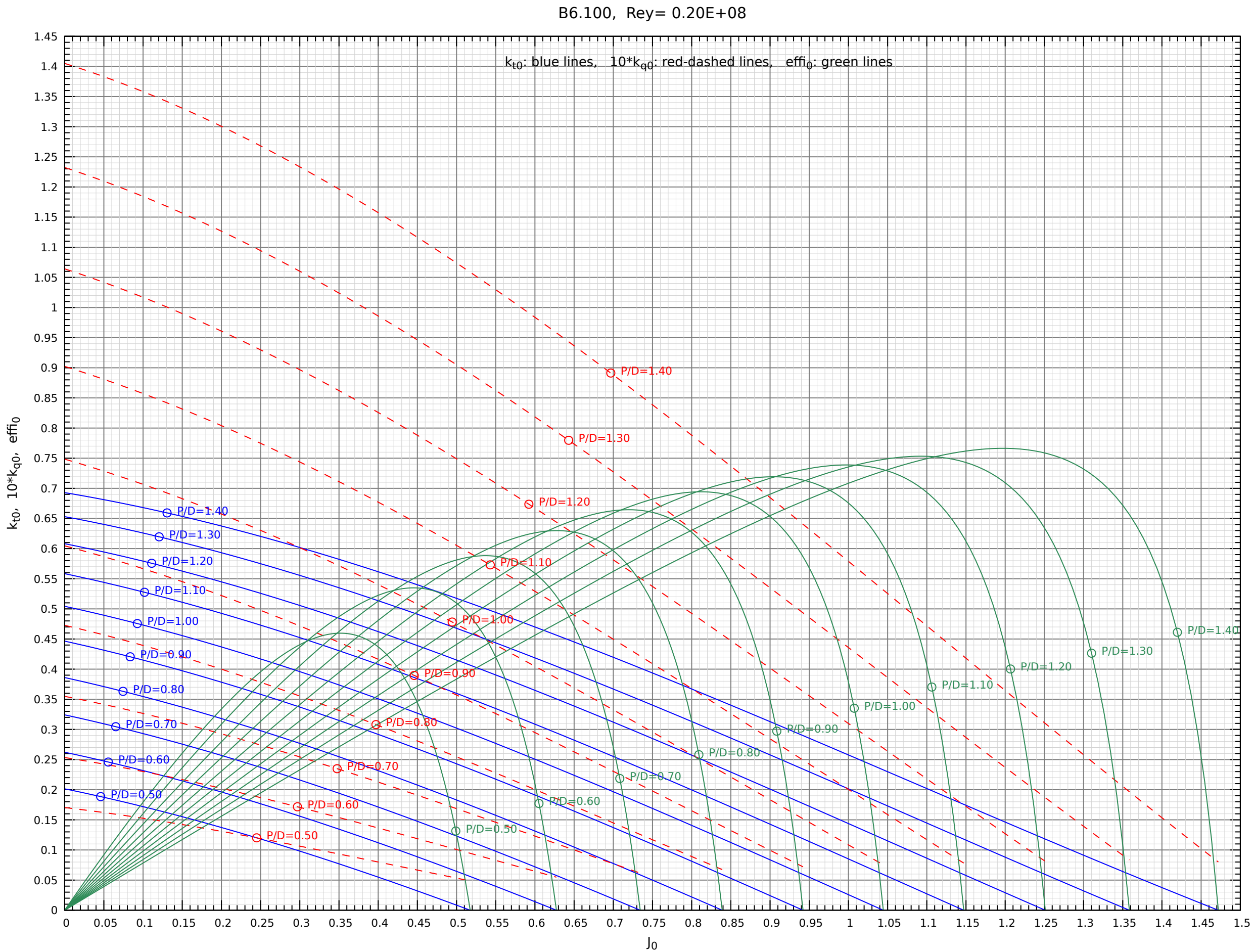
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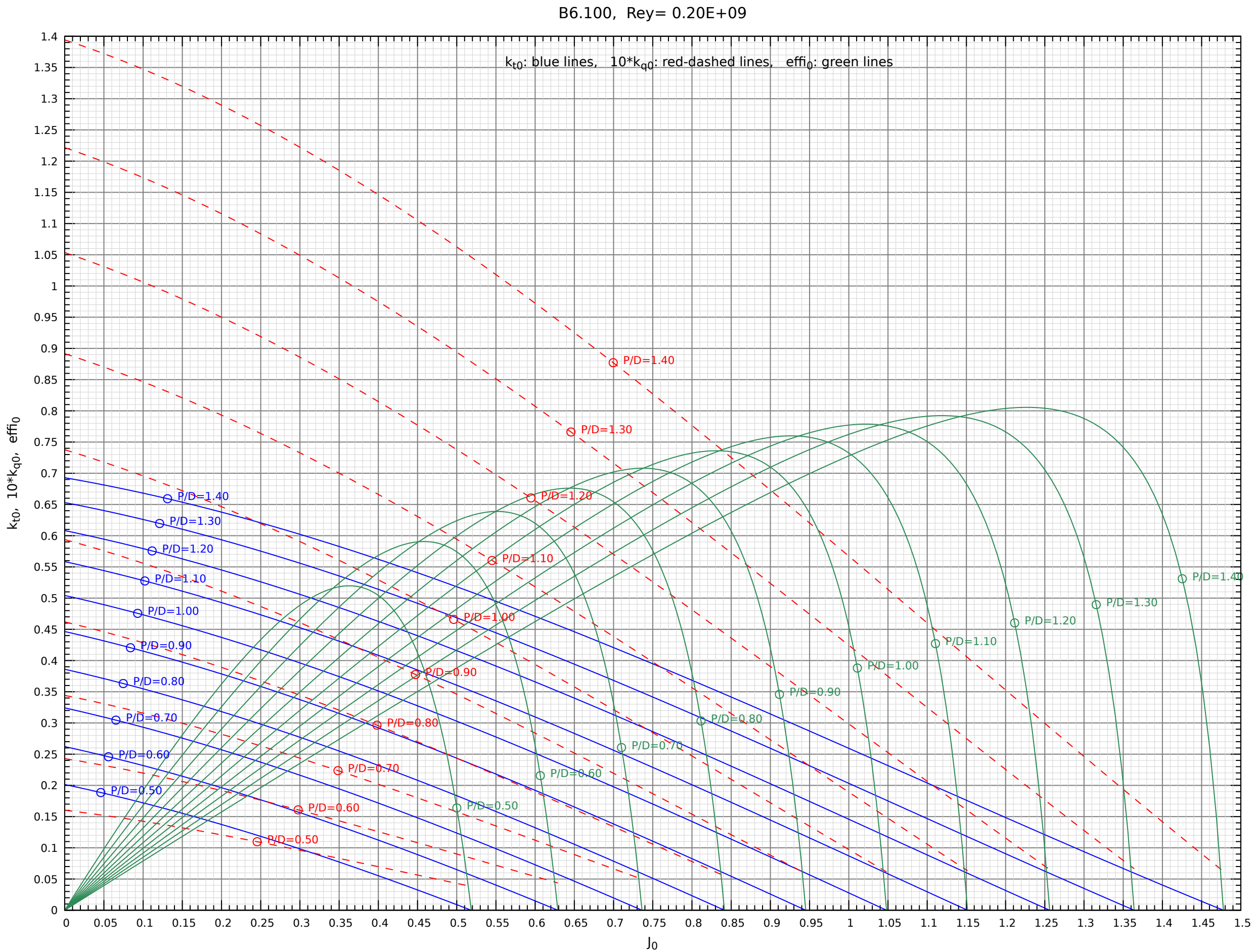
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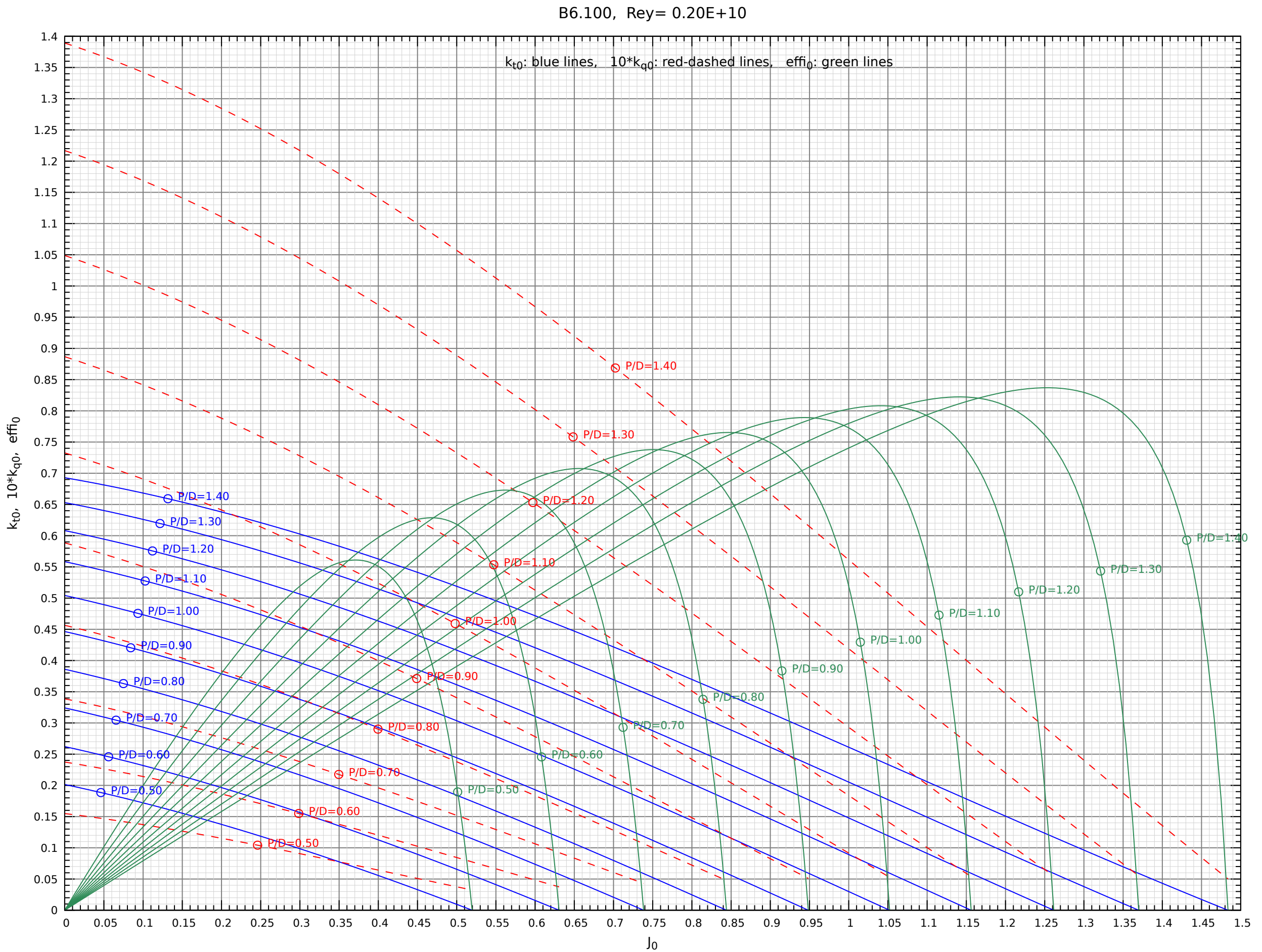
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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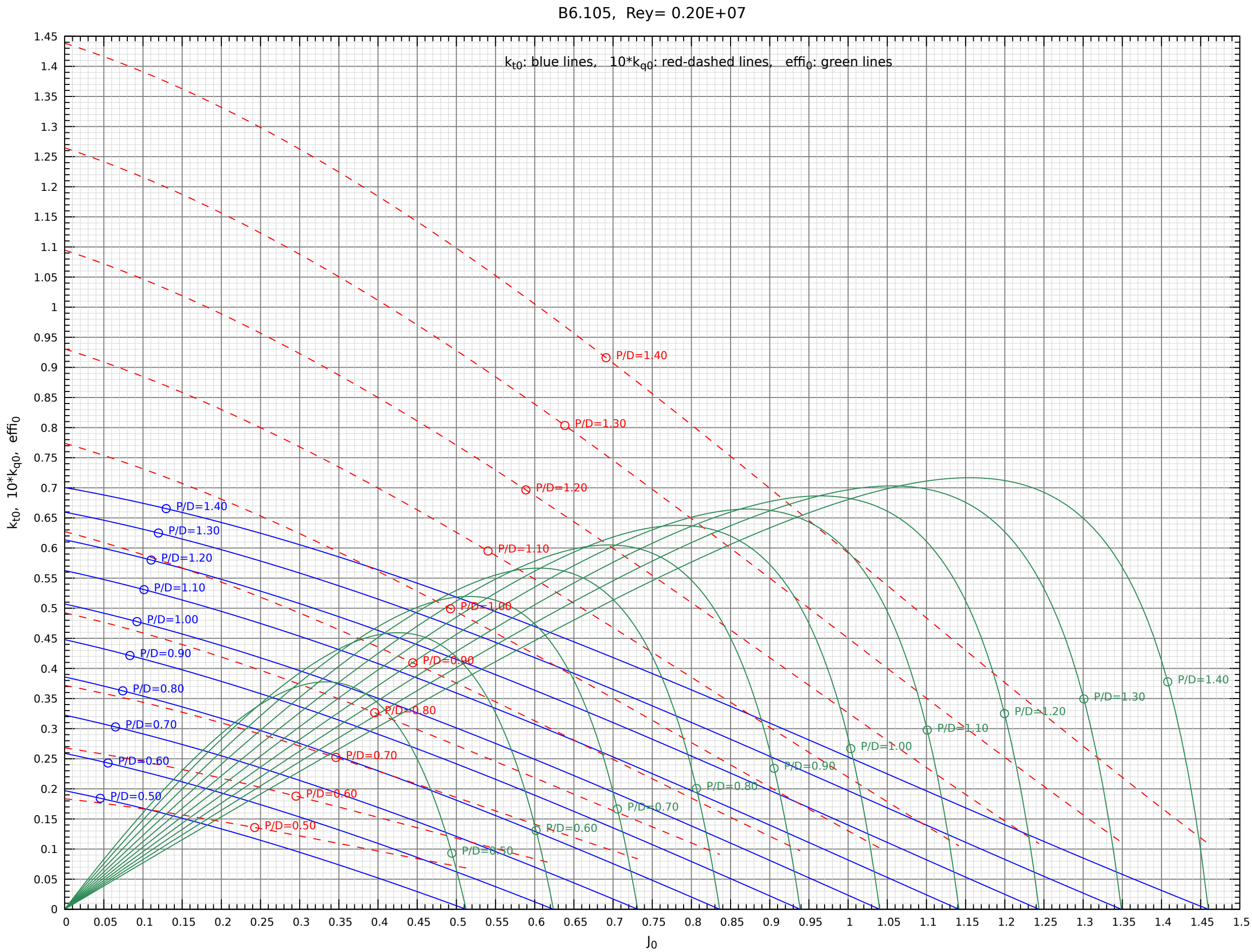
B6.105, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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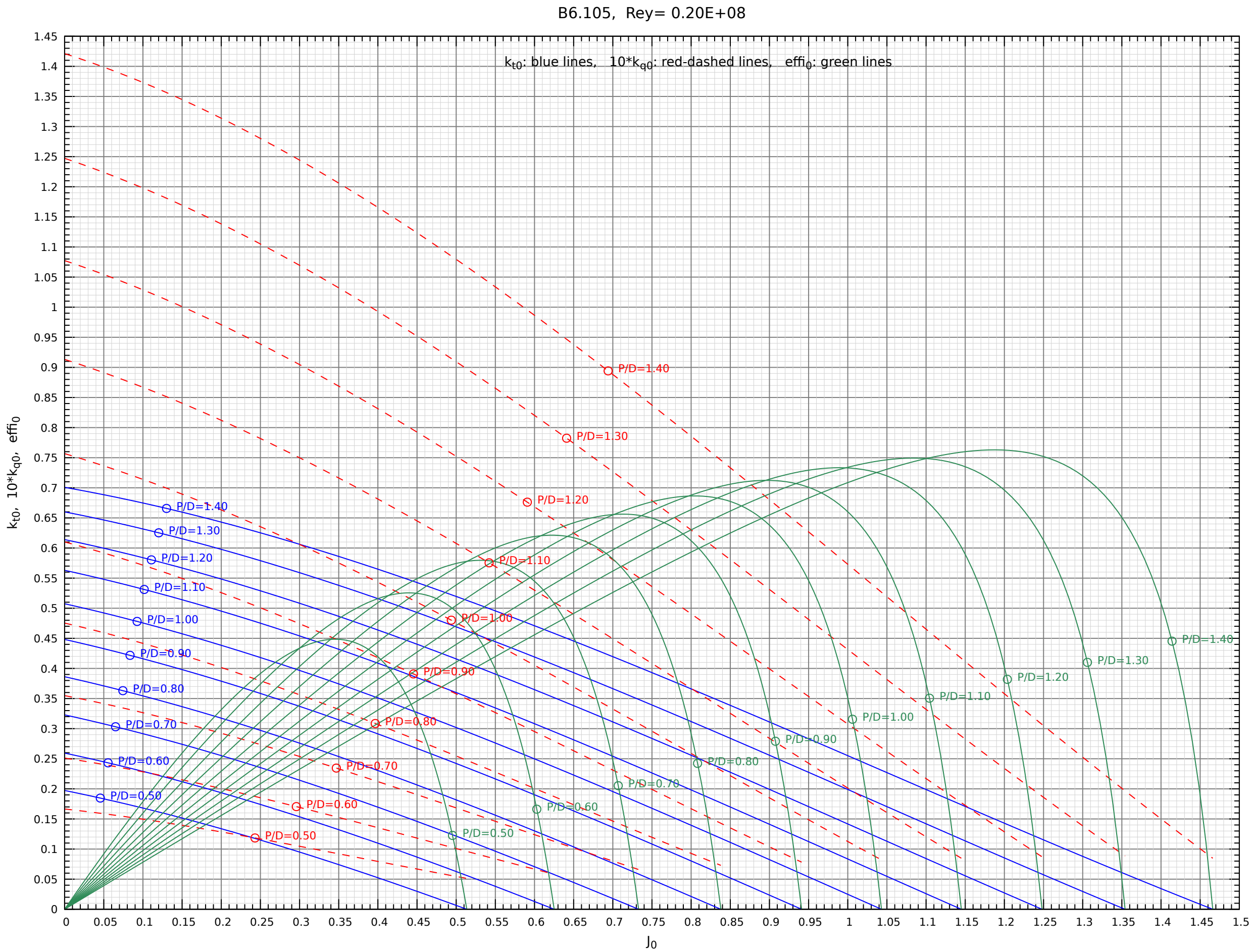
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k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
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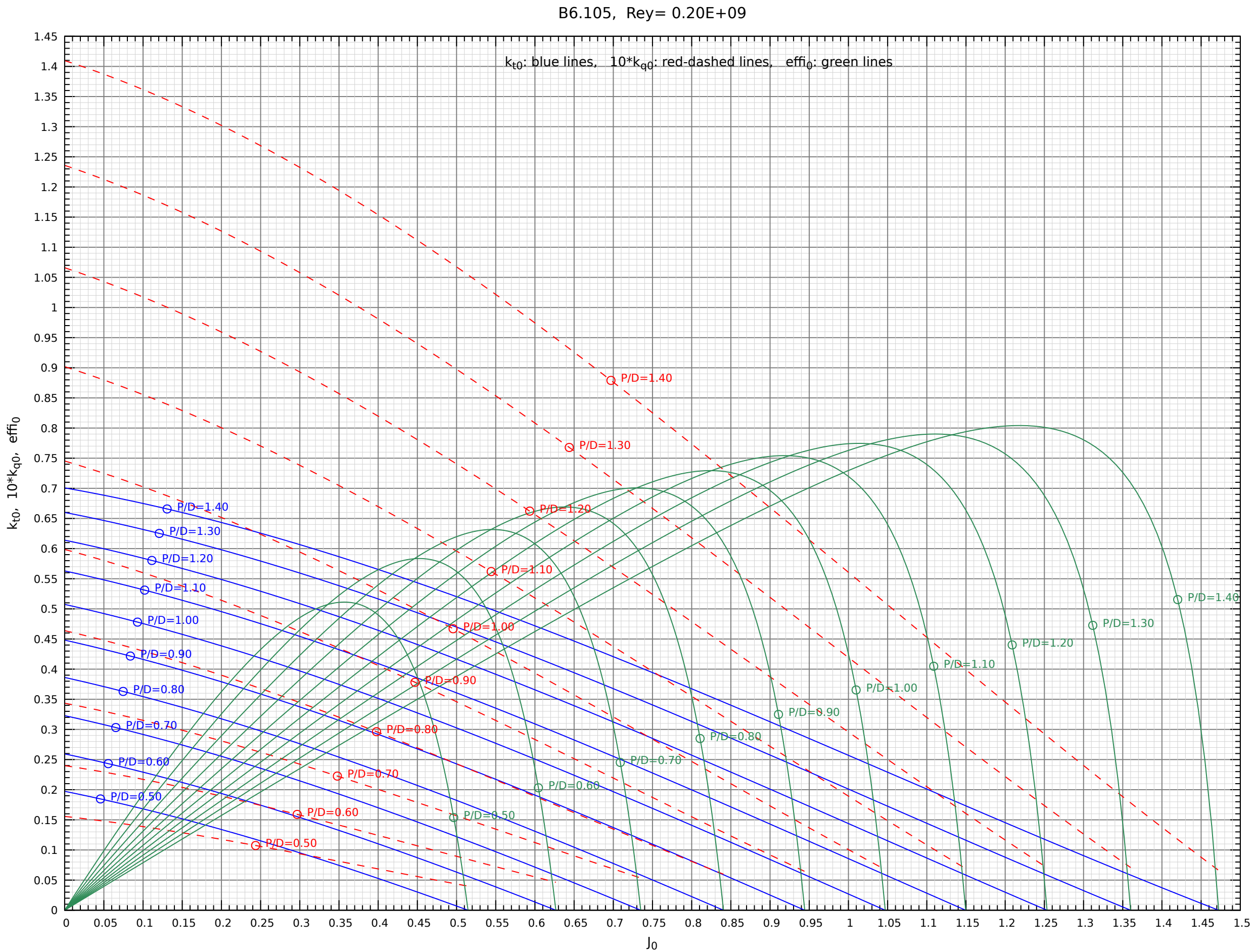
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P/D=1.40
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P/D=1.20
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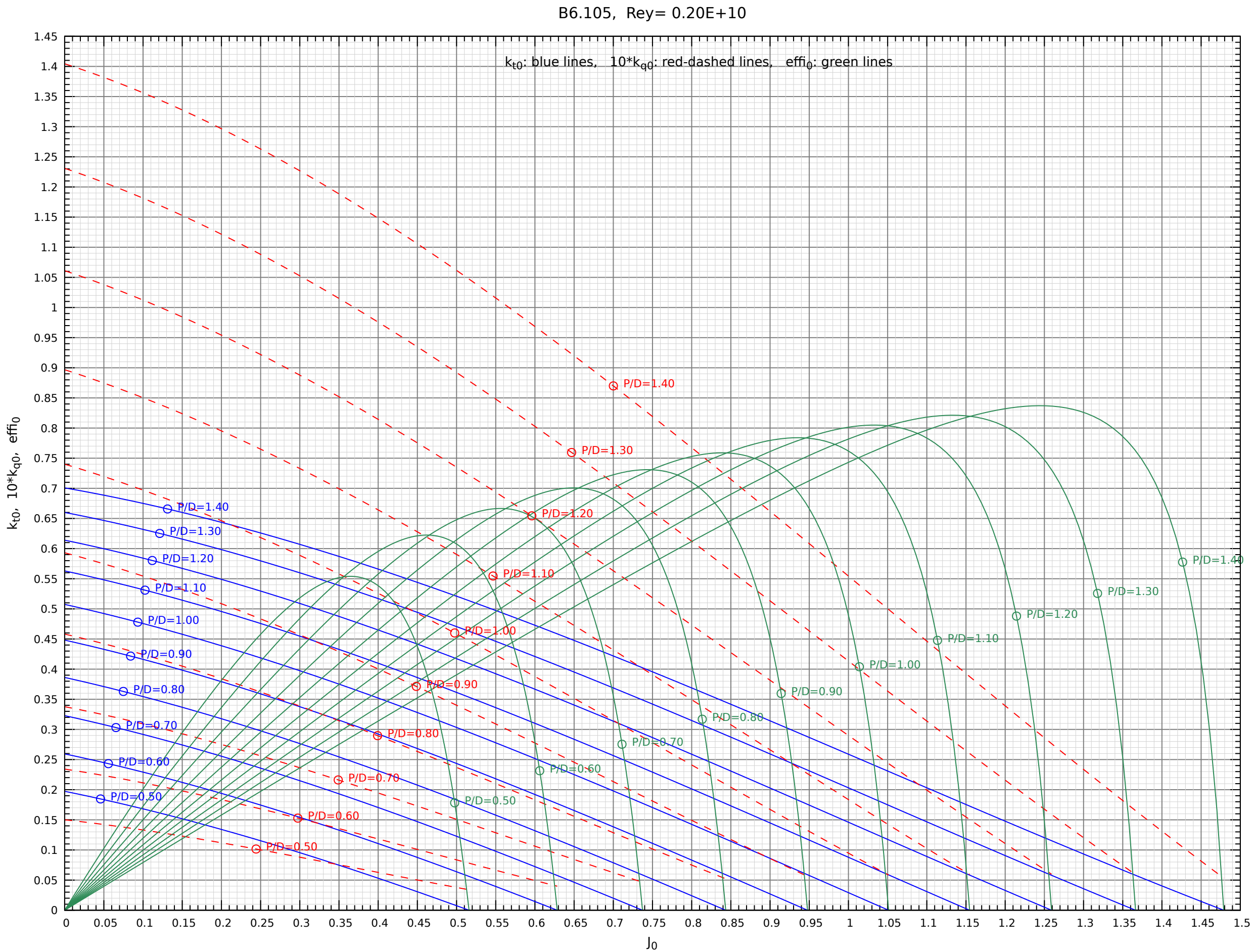
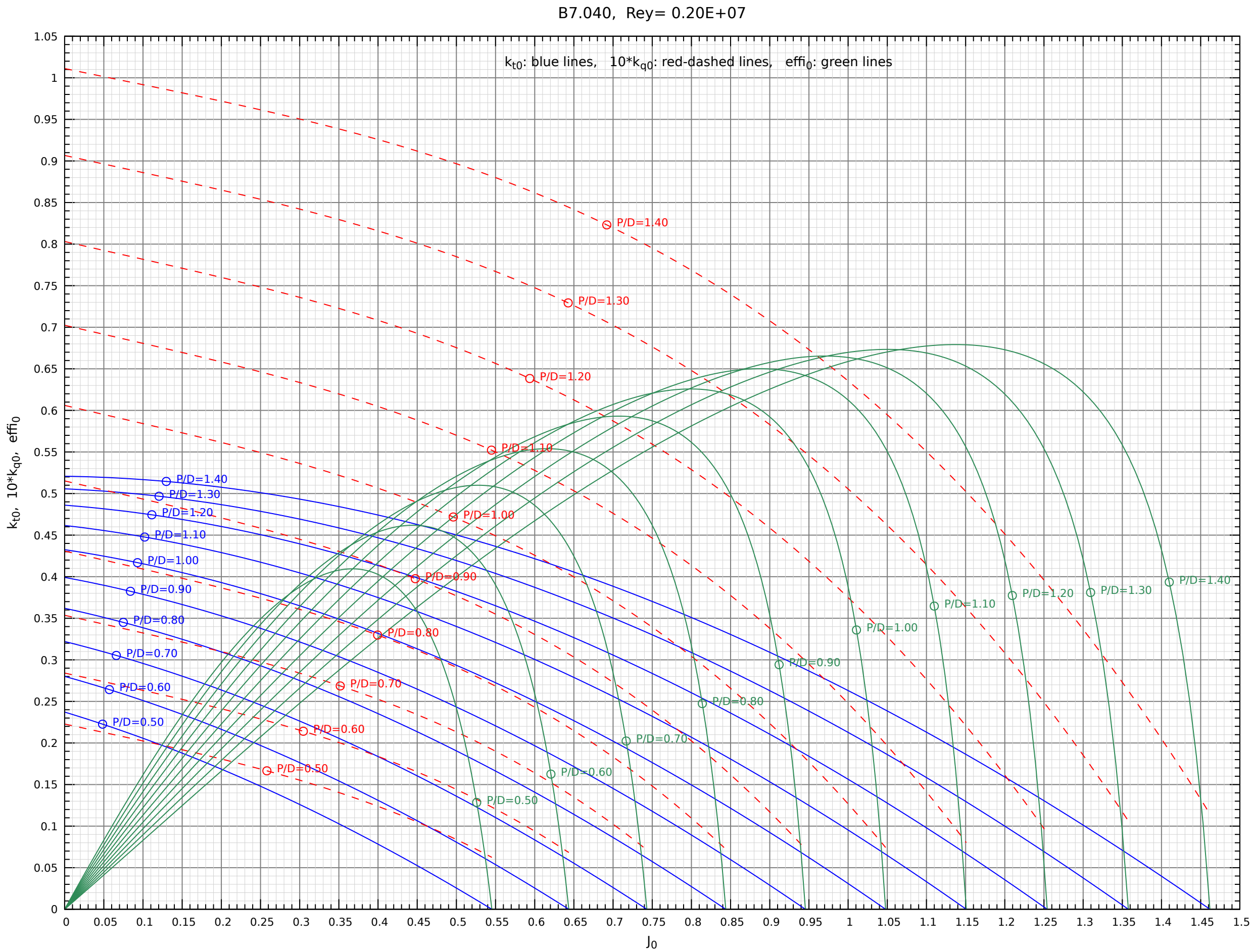
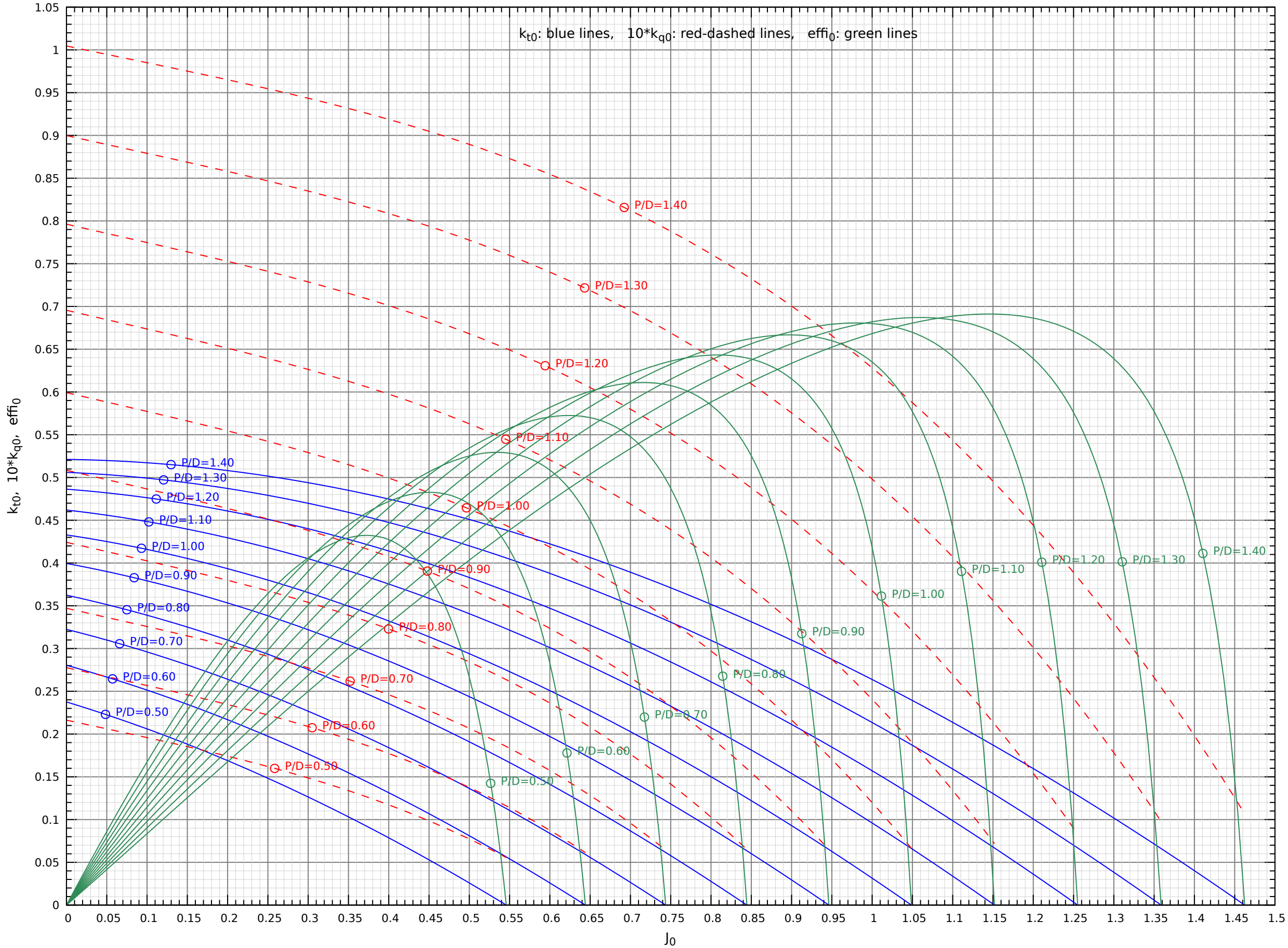
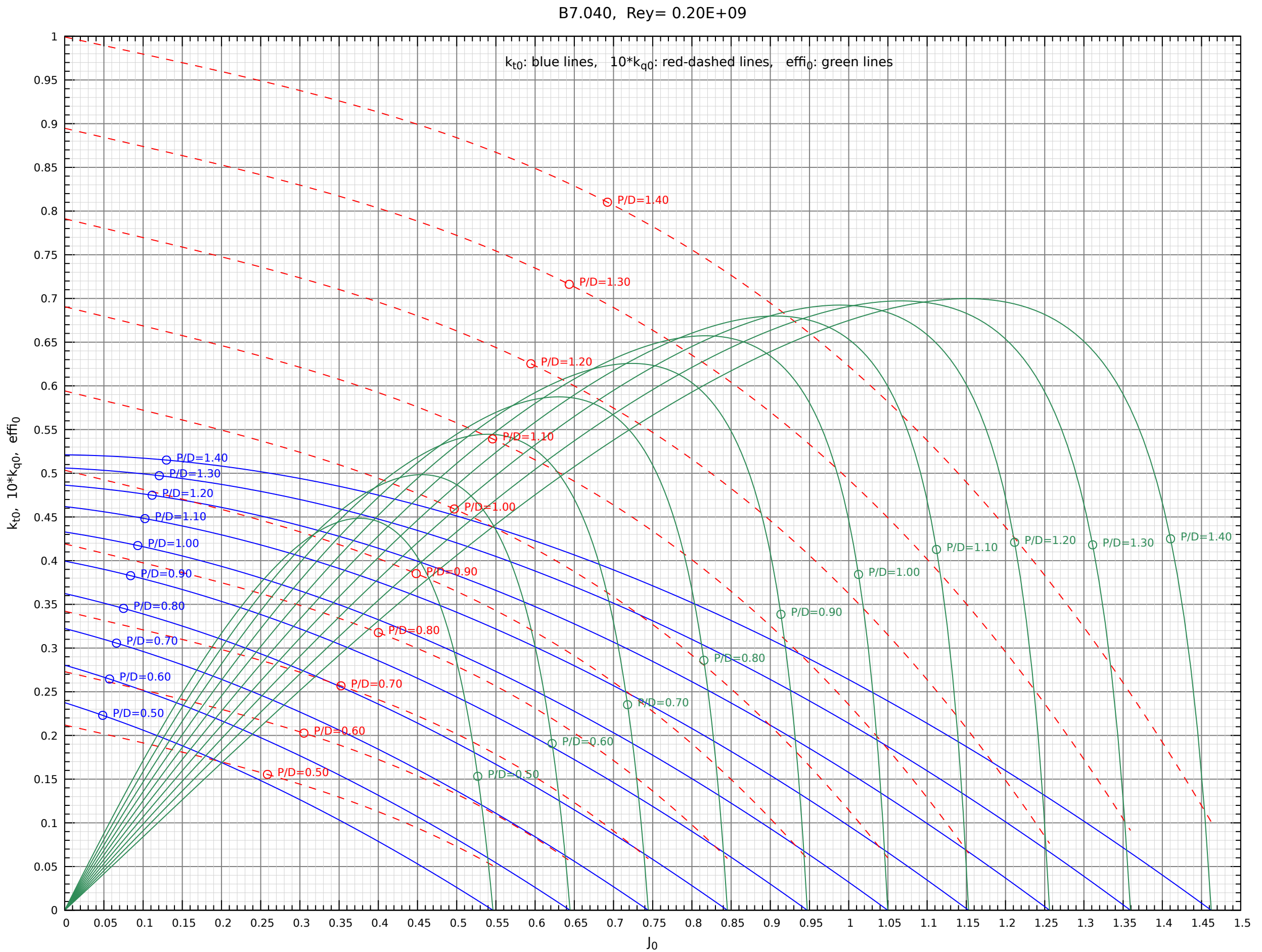
P/D=0.50

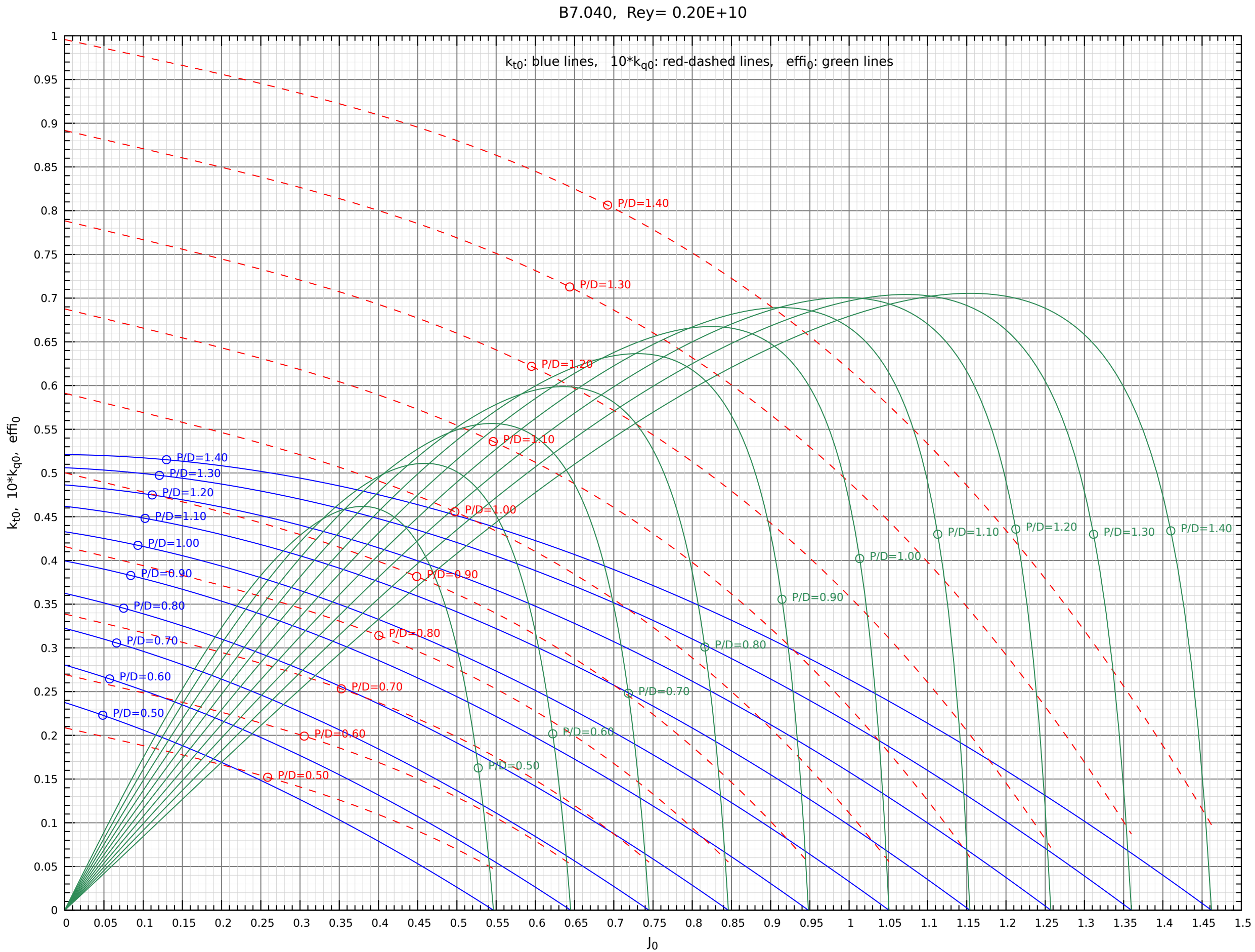

B6.105, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

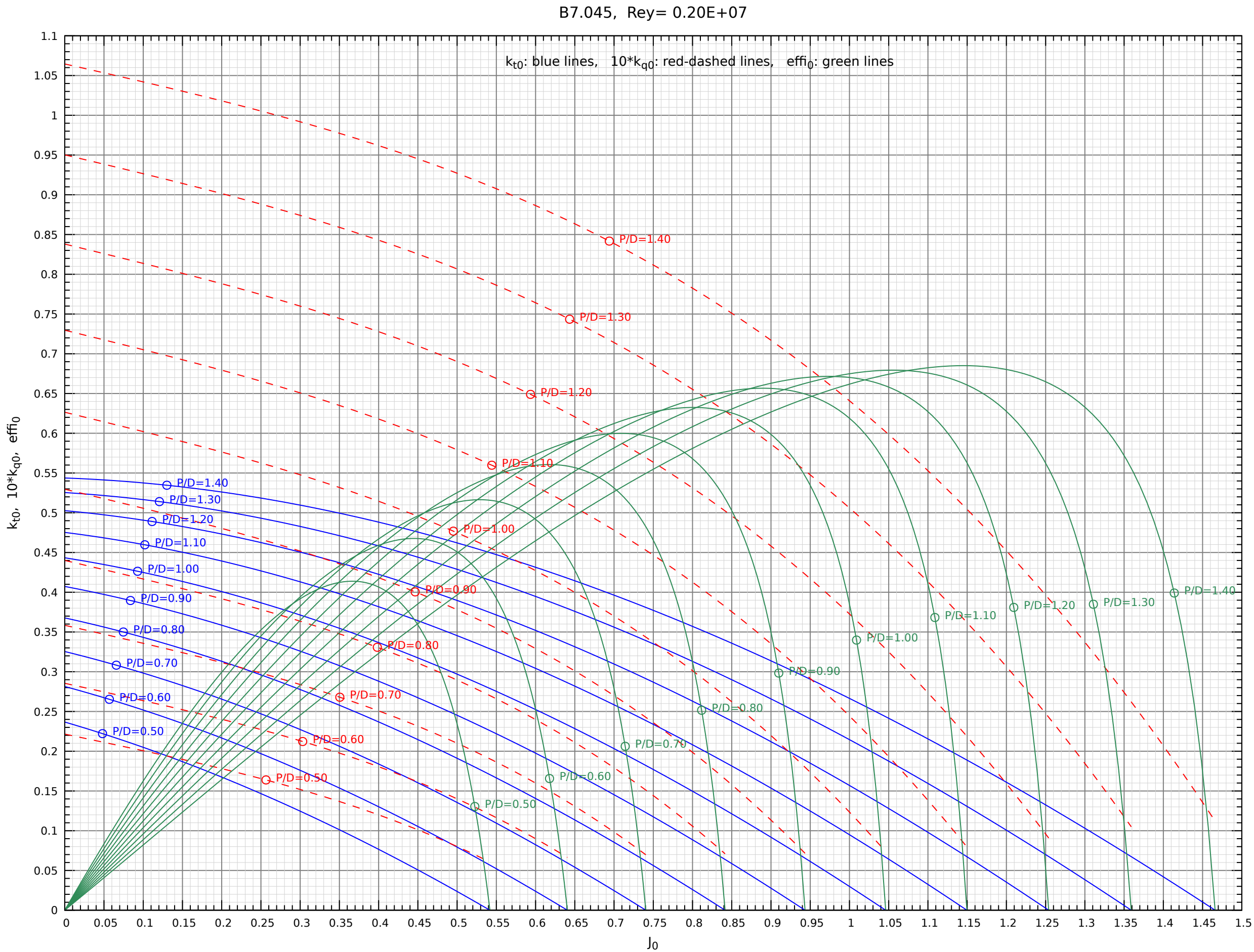

B7.040, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

B7.040, Rey= 0.20E+08

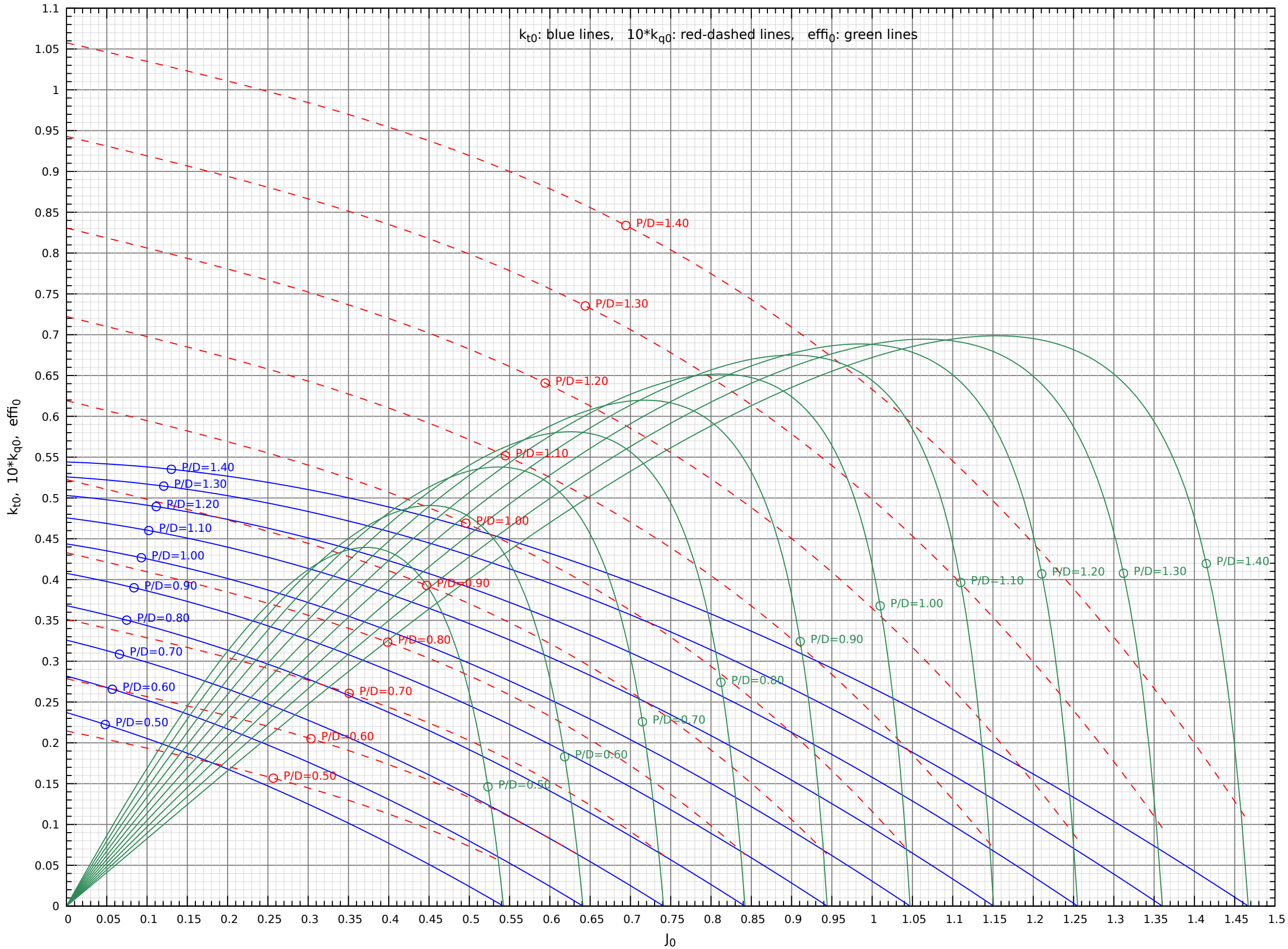


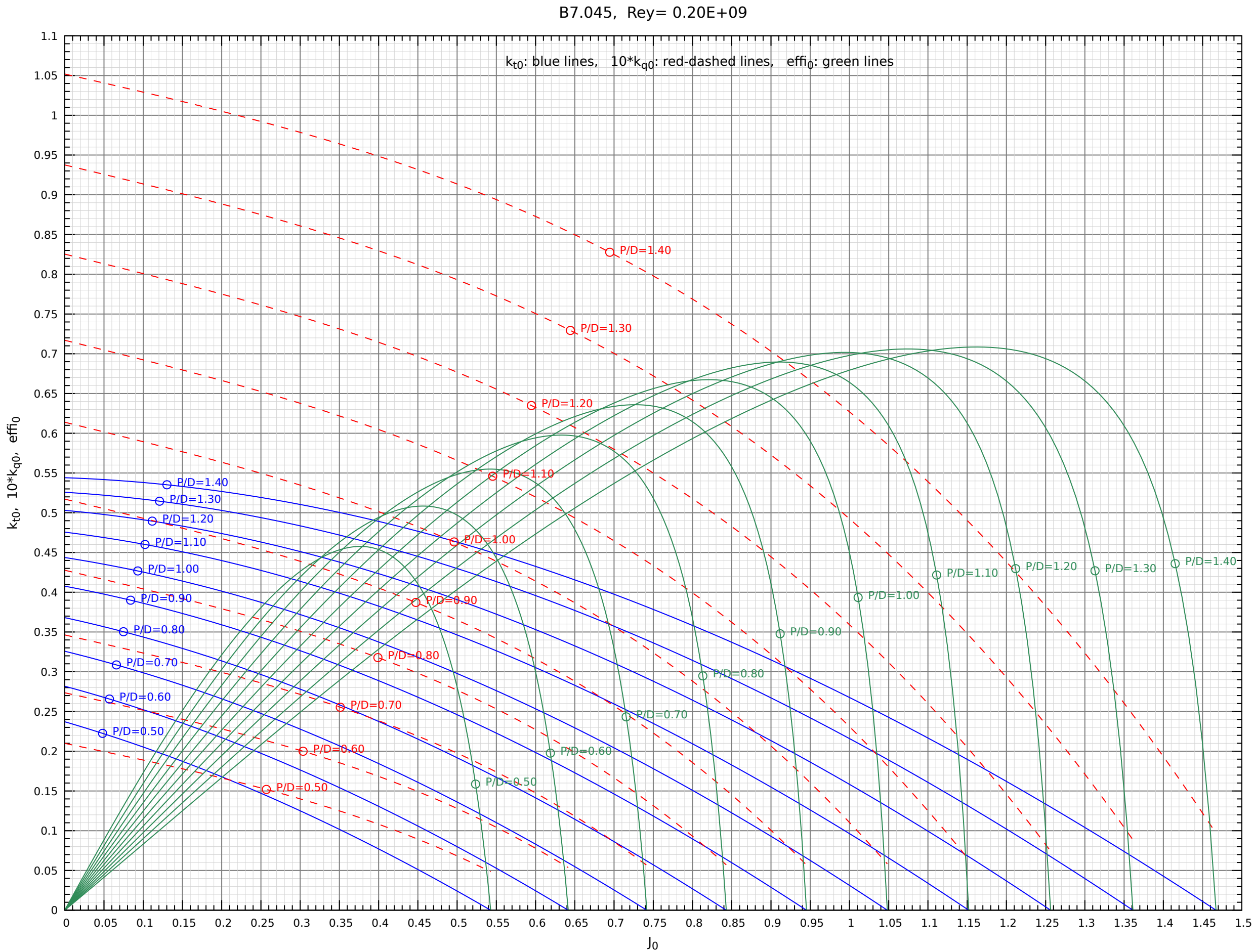

B7.040, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

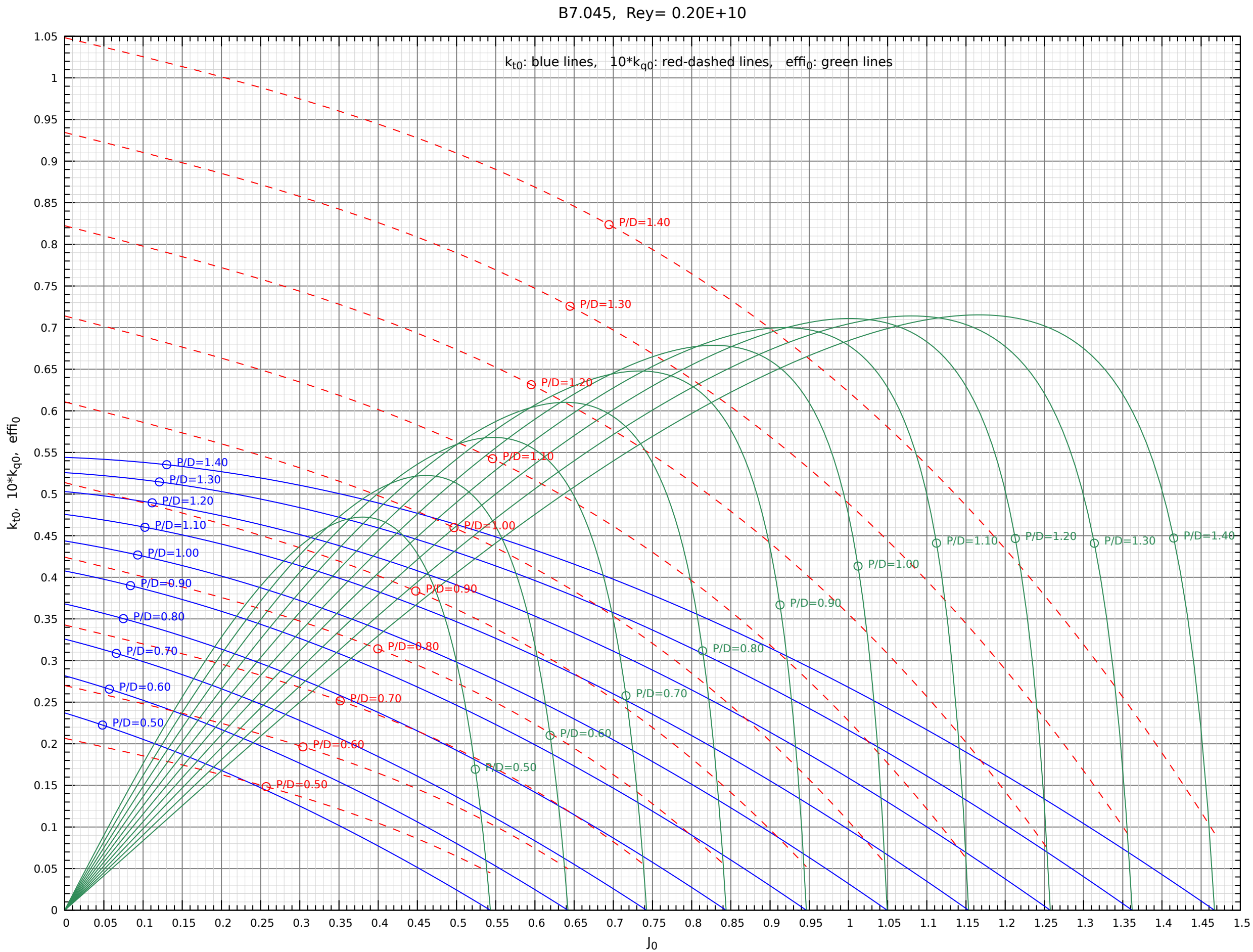

B7.040, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

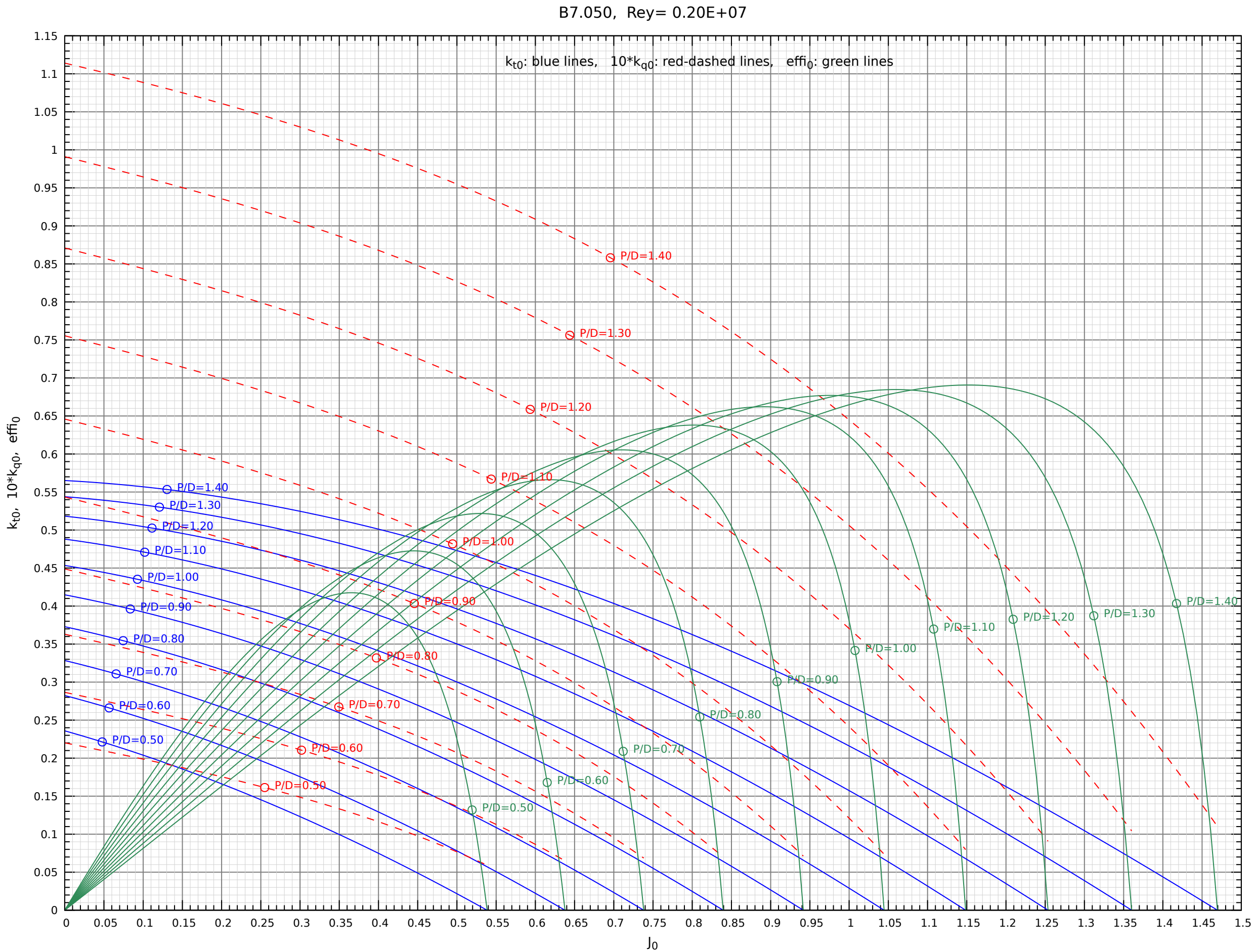

B7.045, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50

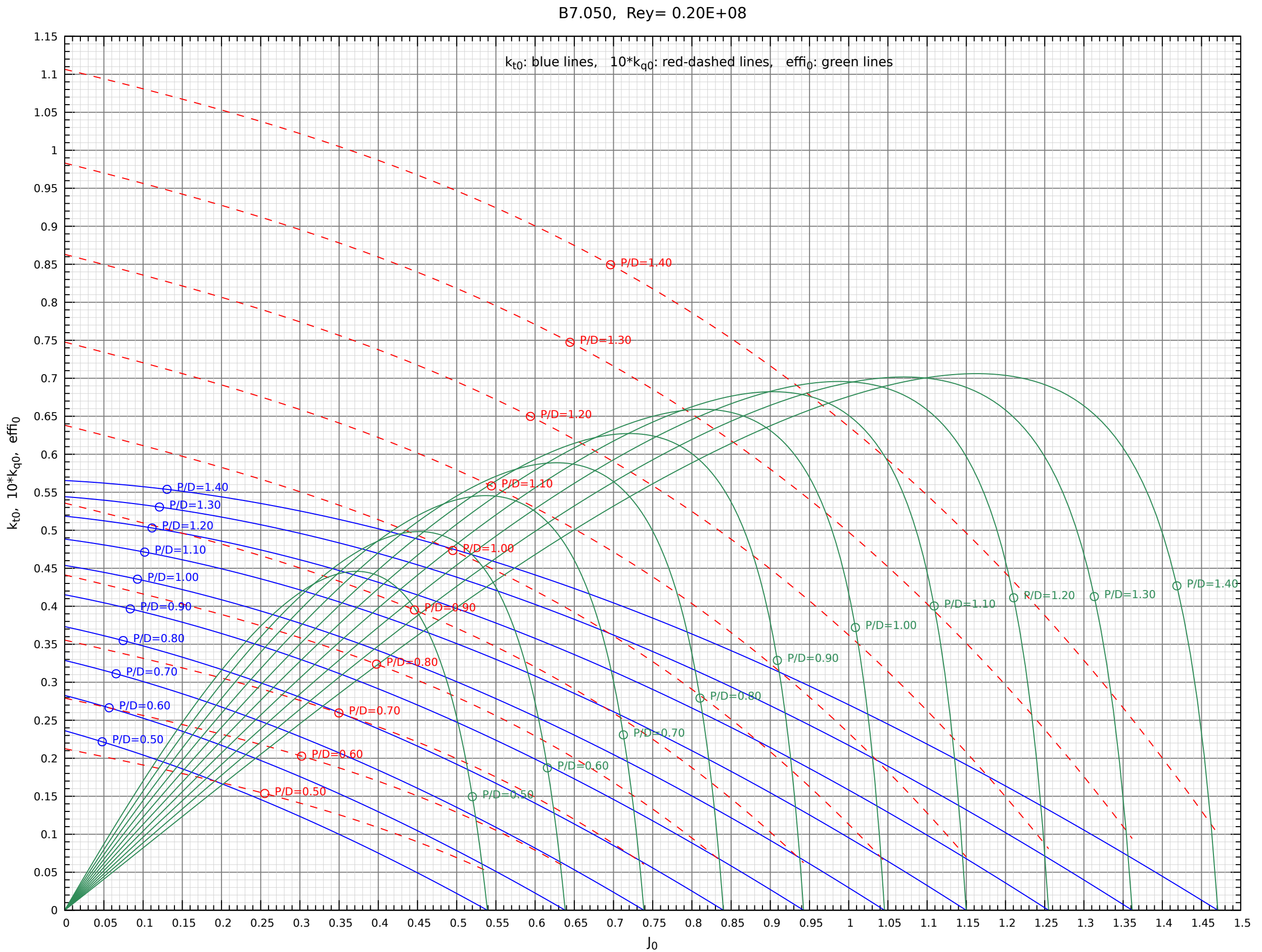
B7.045, Rey= 0.20E+08




B7.045, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.045, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.050, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.050, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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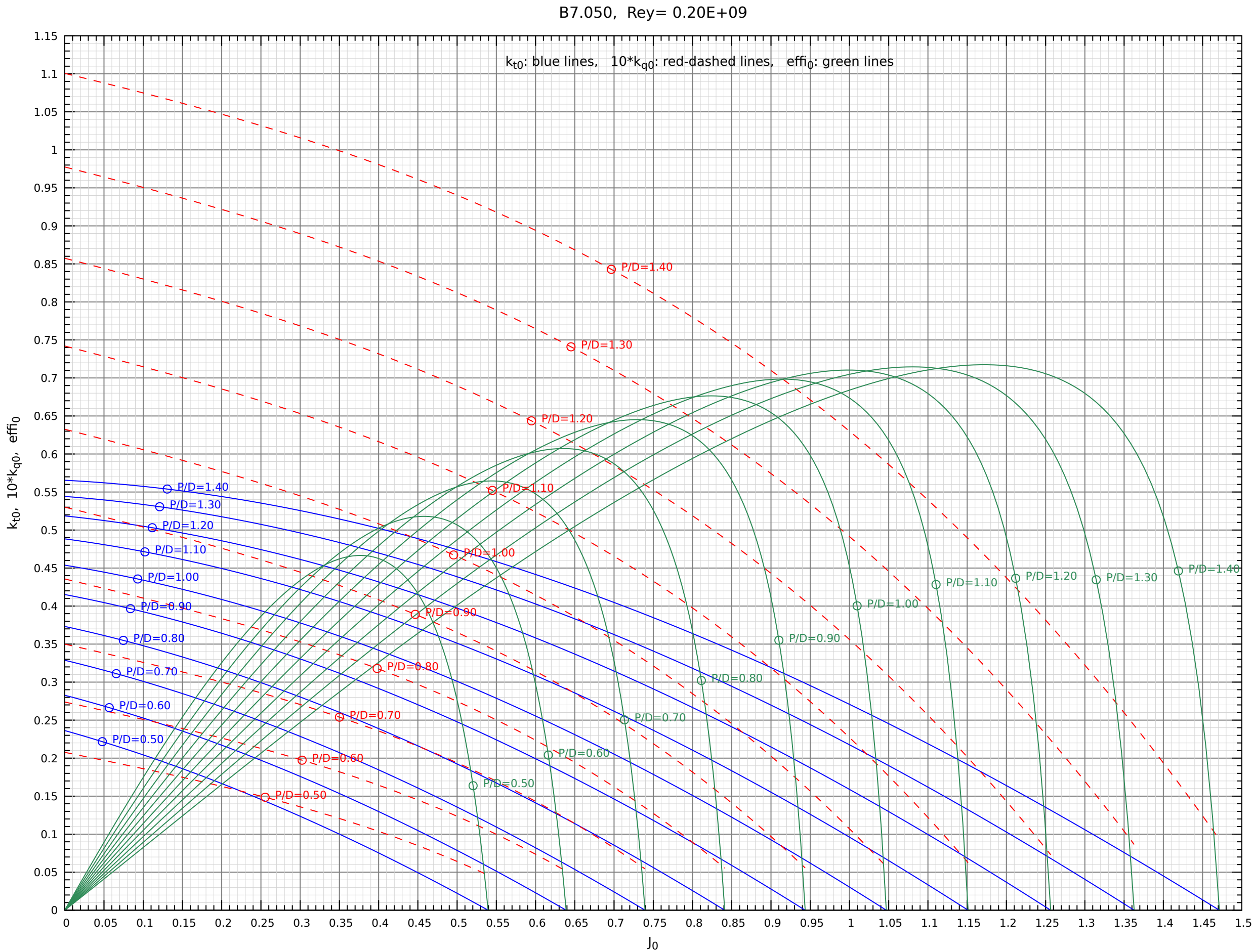
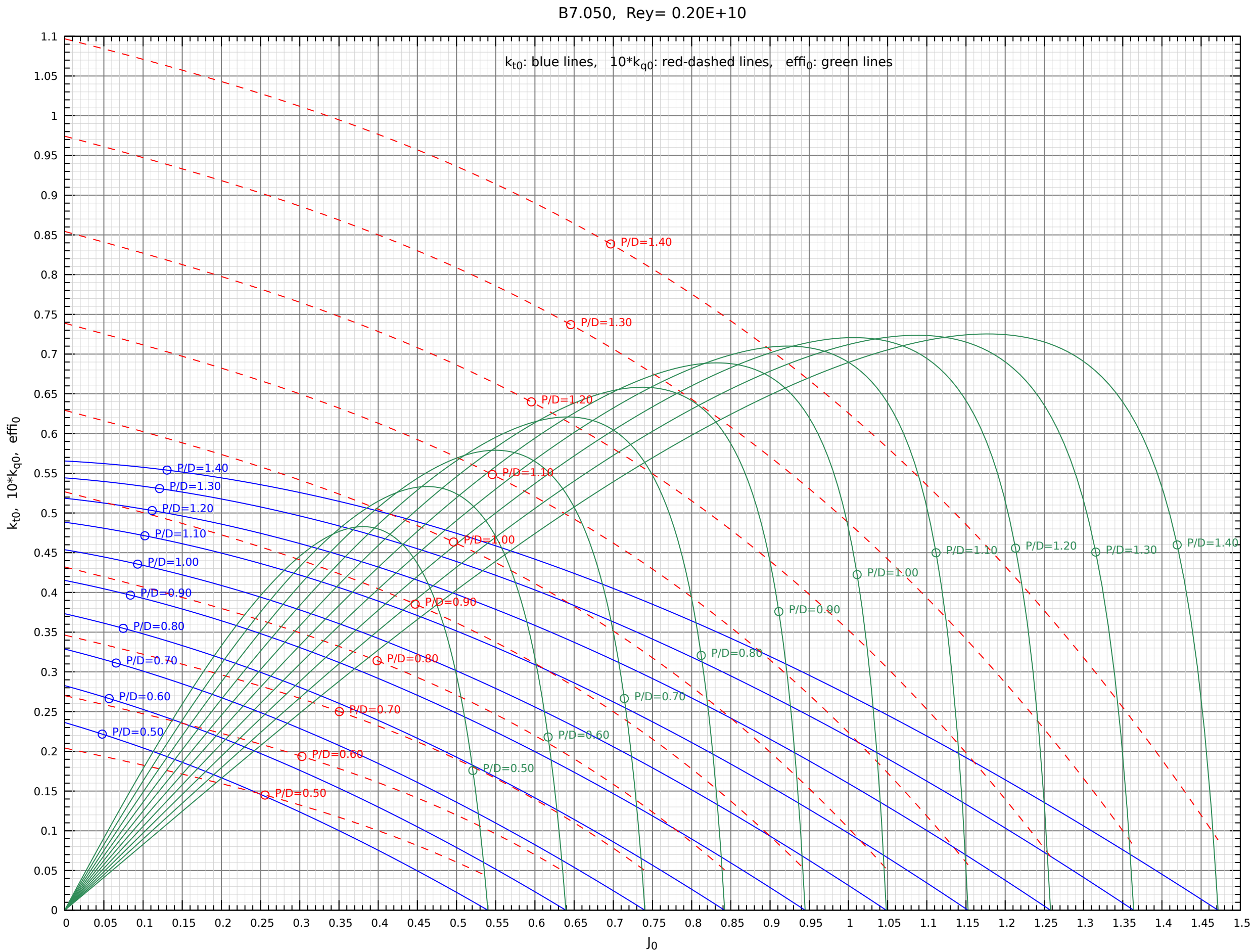
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.050, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.050, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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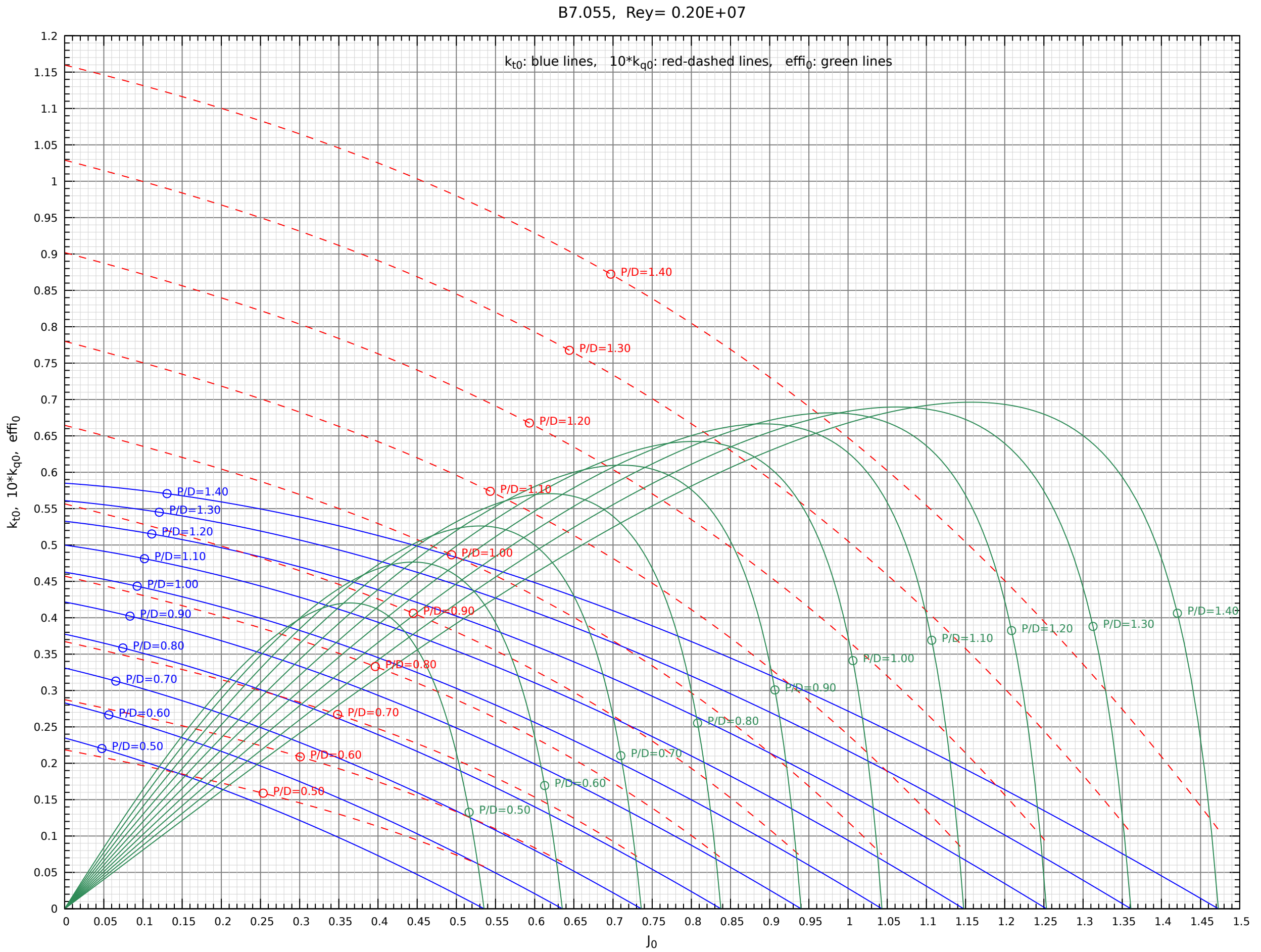
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.055, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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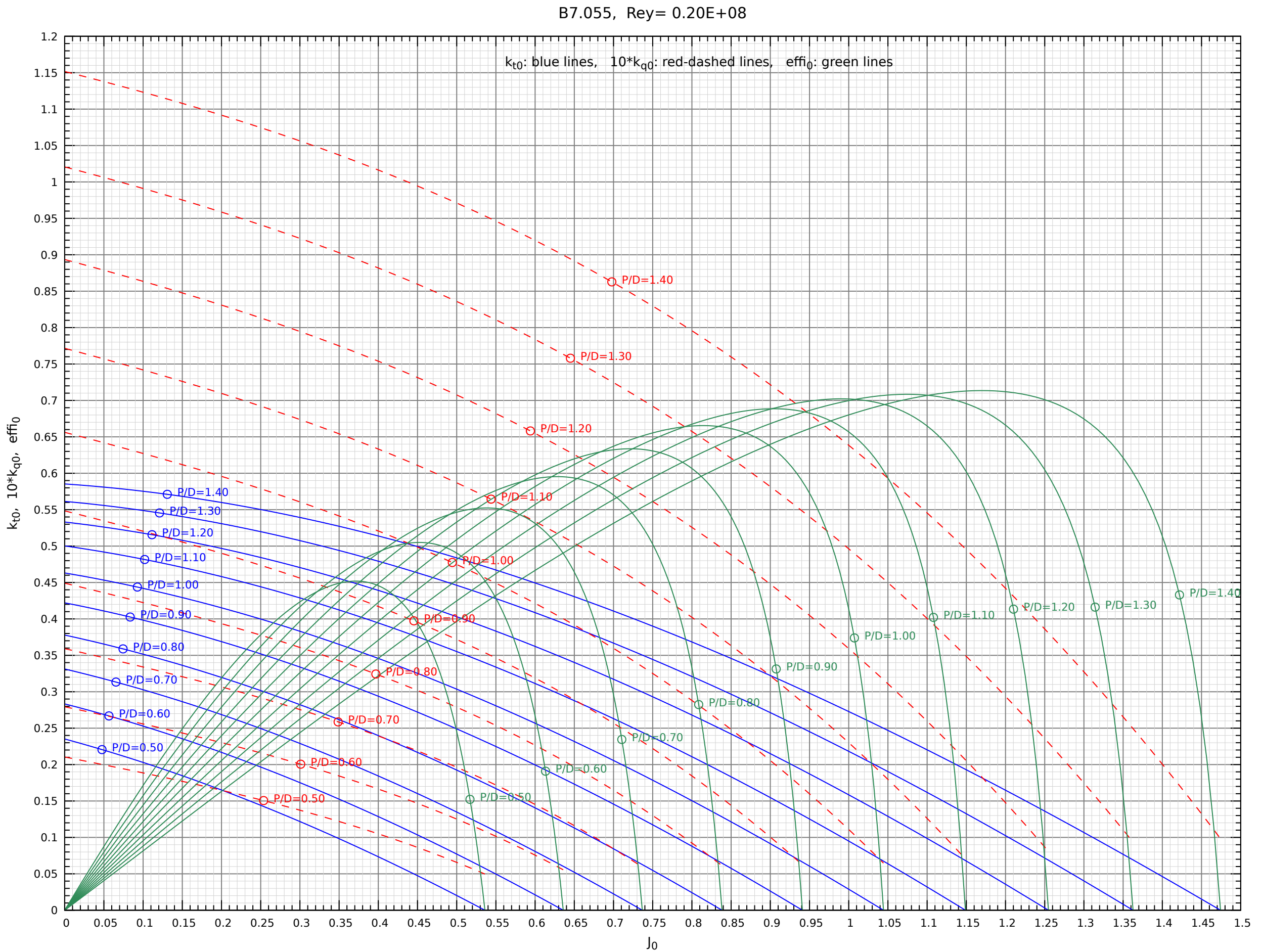
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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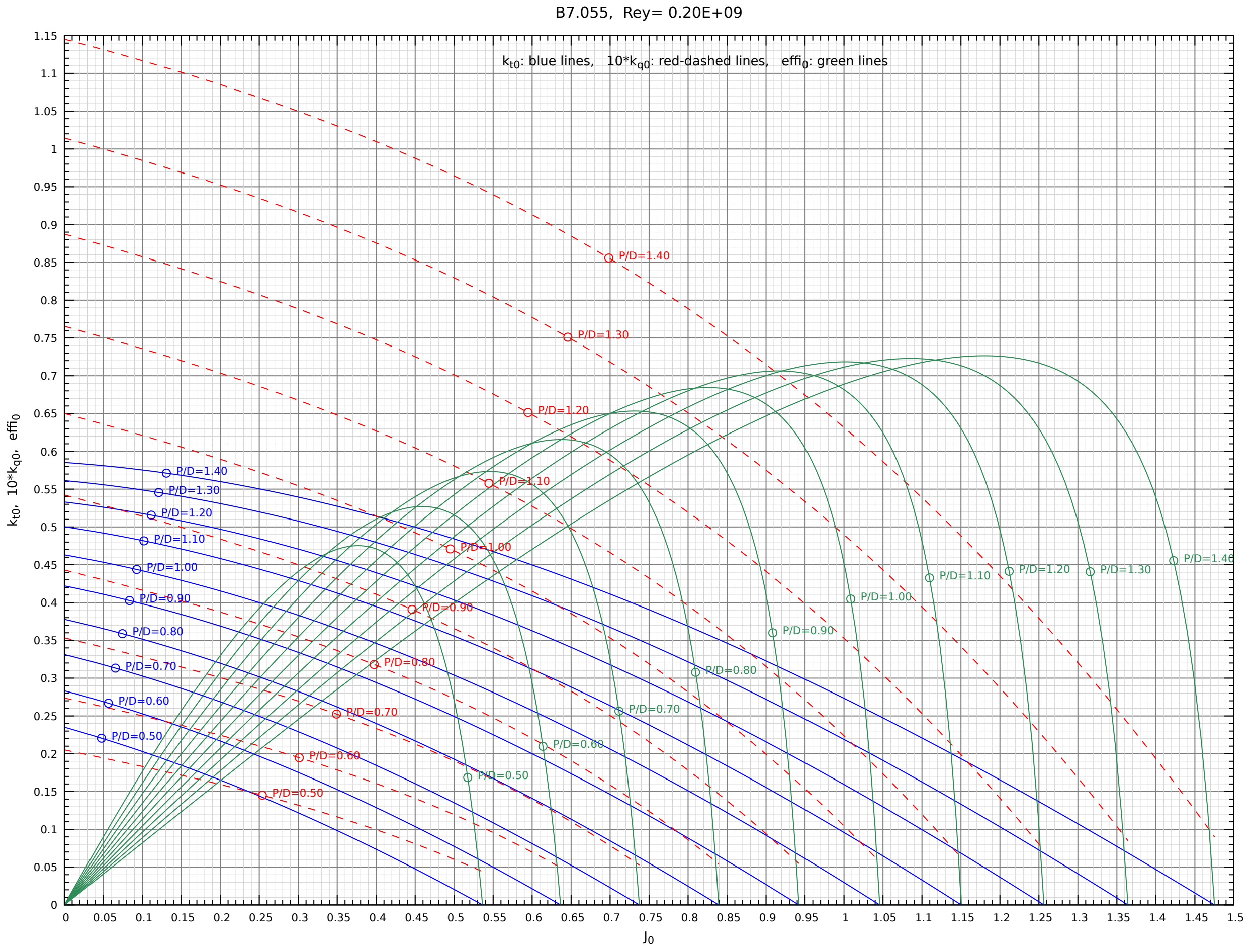
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.055, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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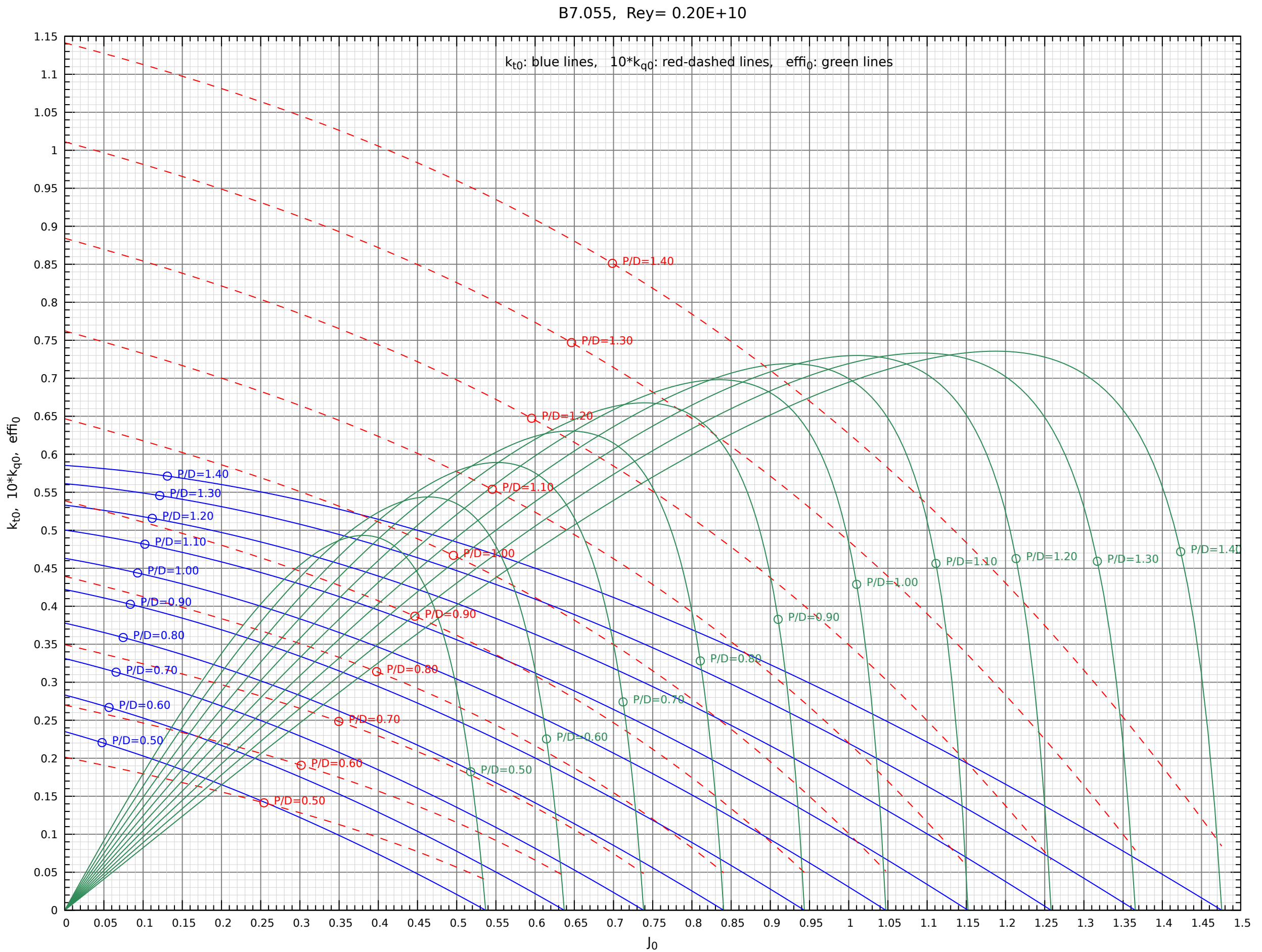
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.055, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.90
P/D=0.80
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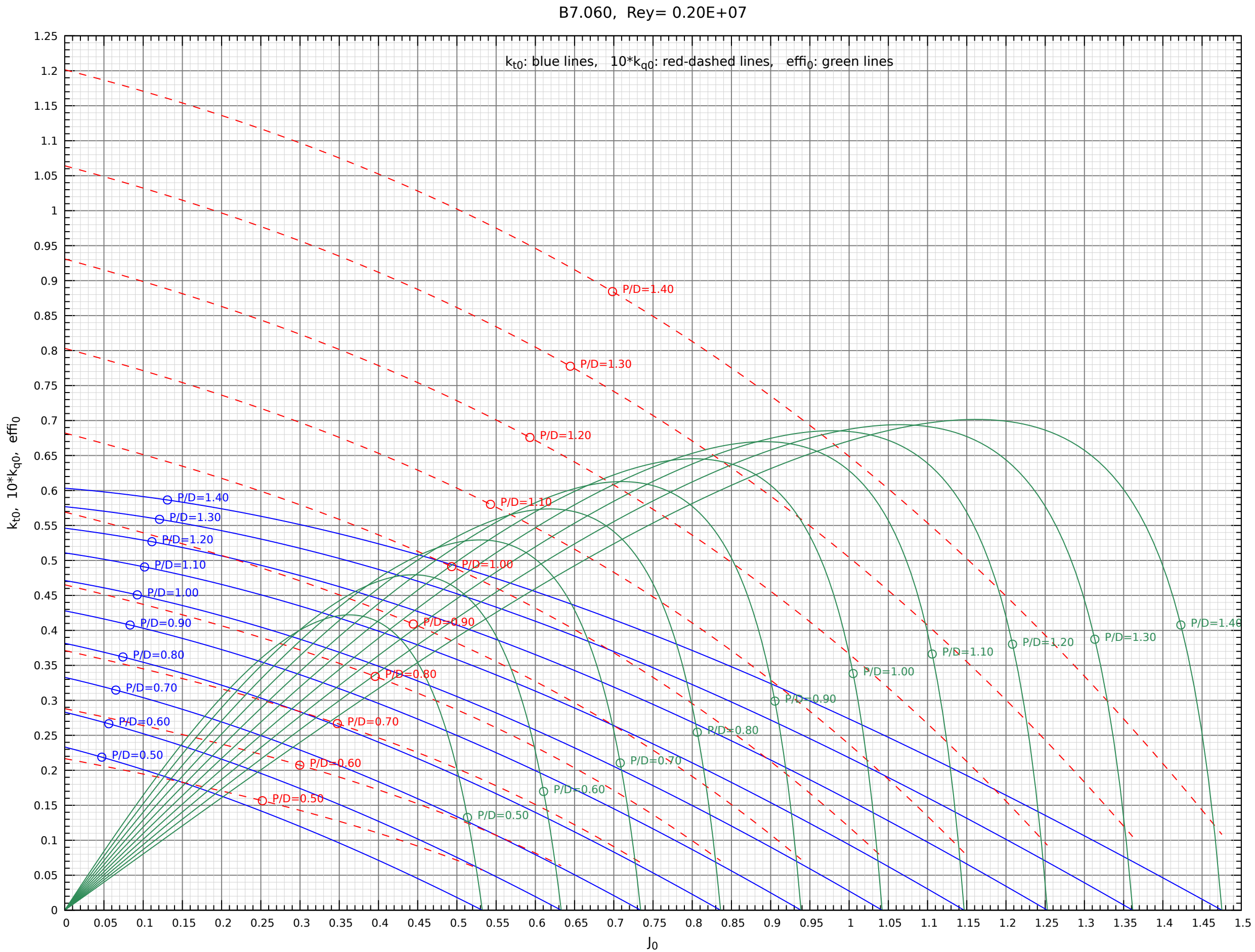
P/D=0.60
P/D=0.50


B7.060, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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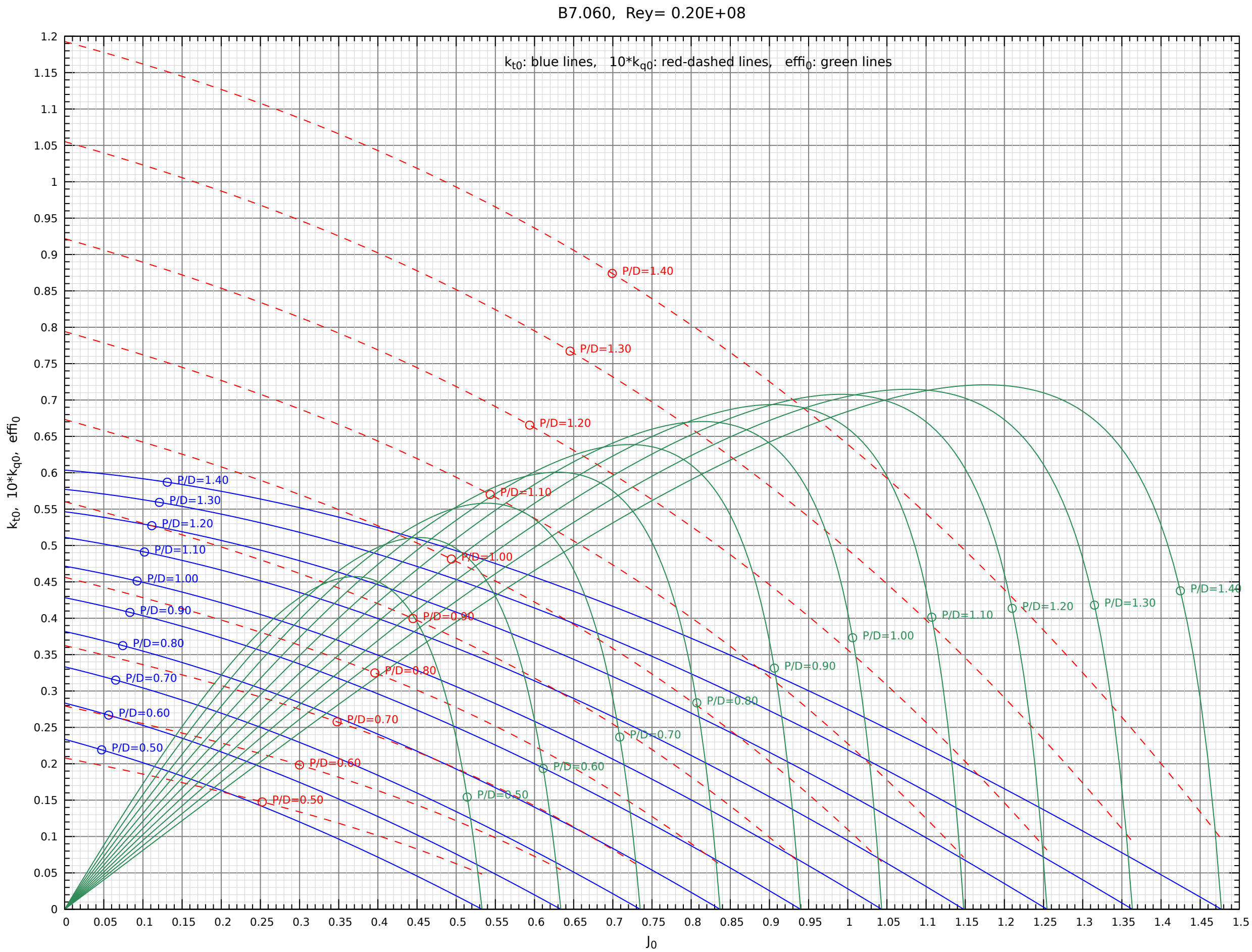
B7.060, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
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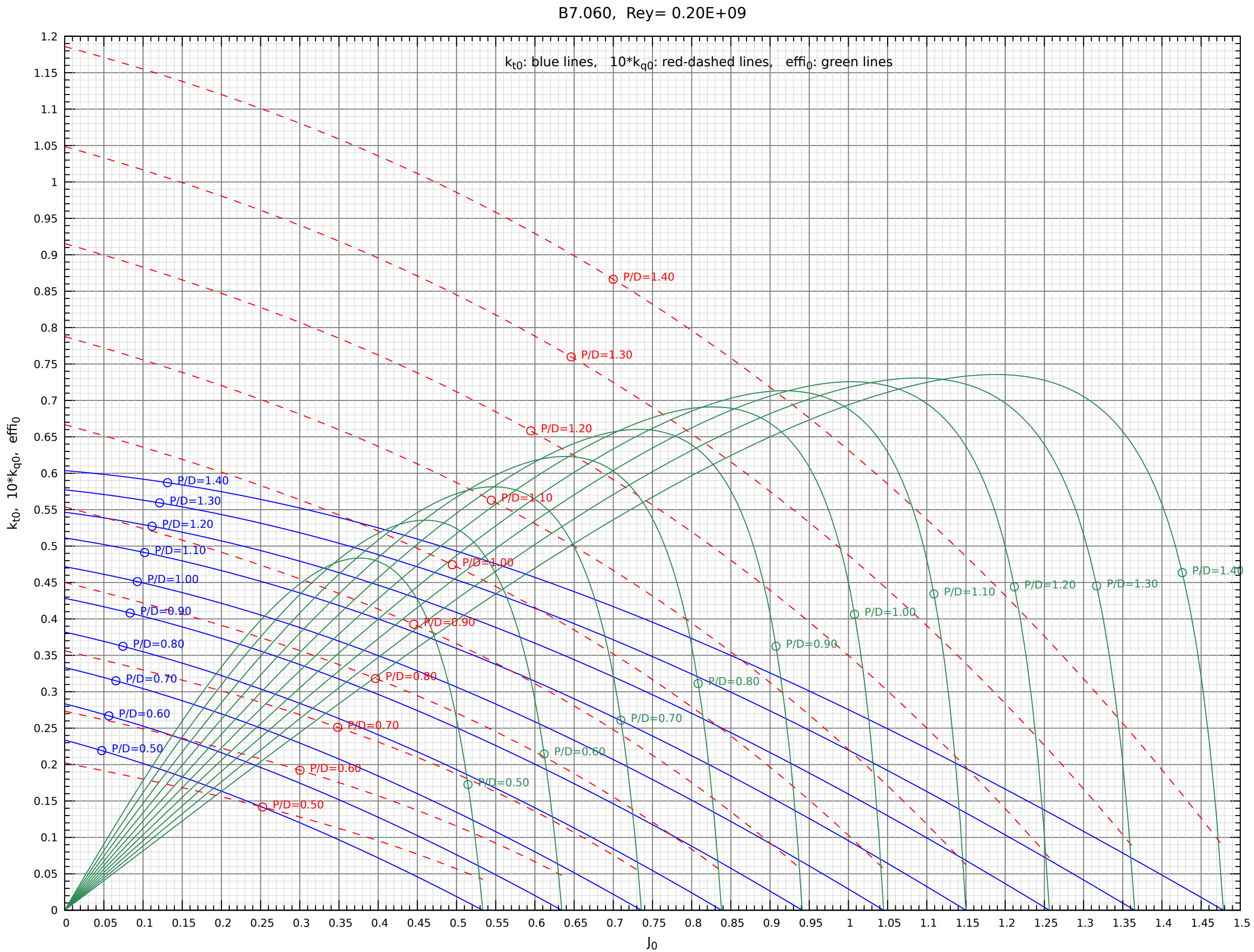
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0


B7.060, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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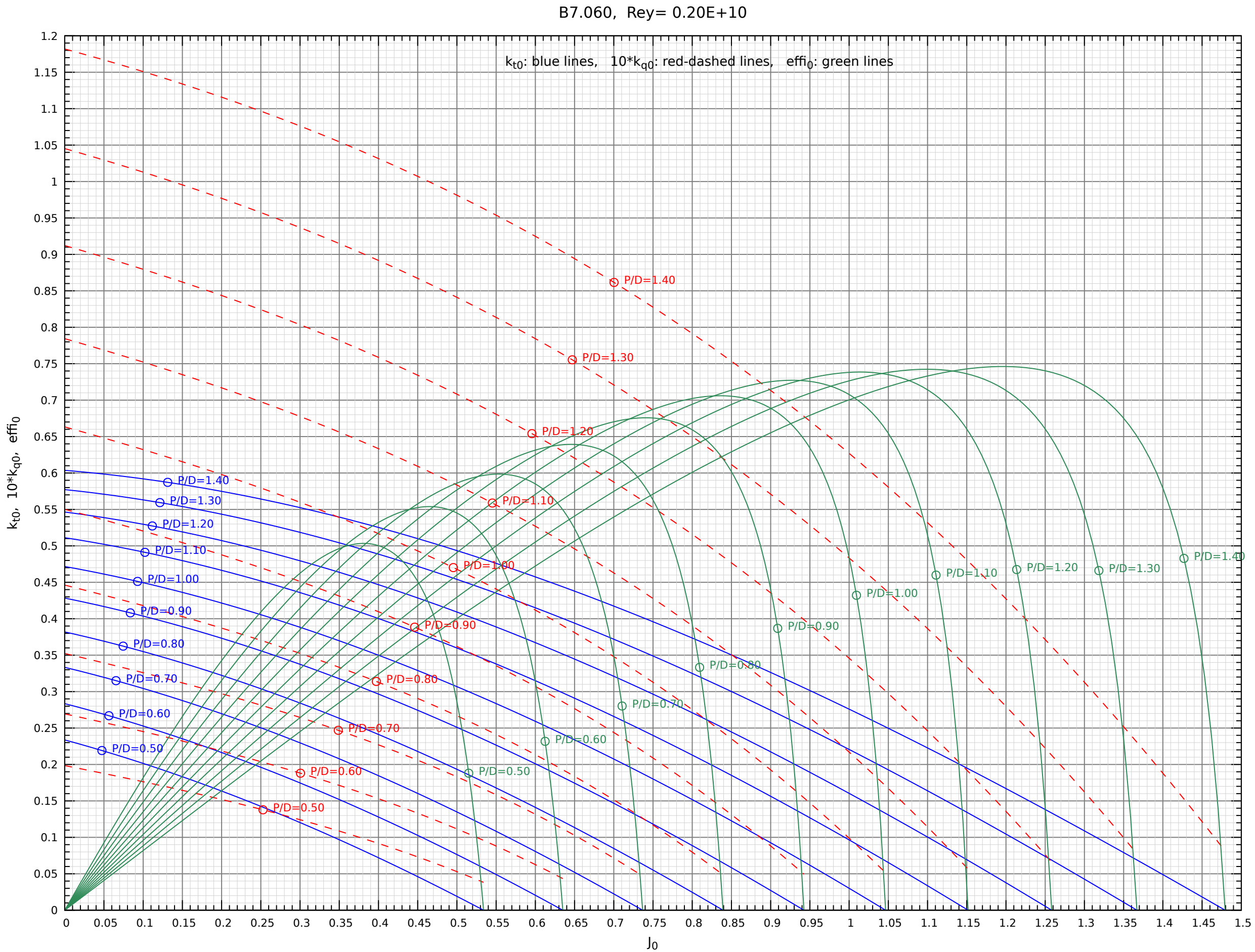
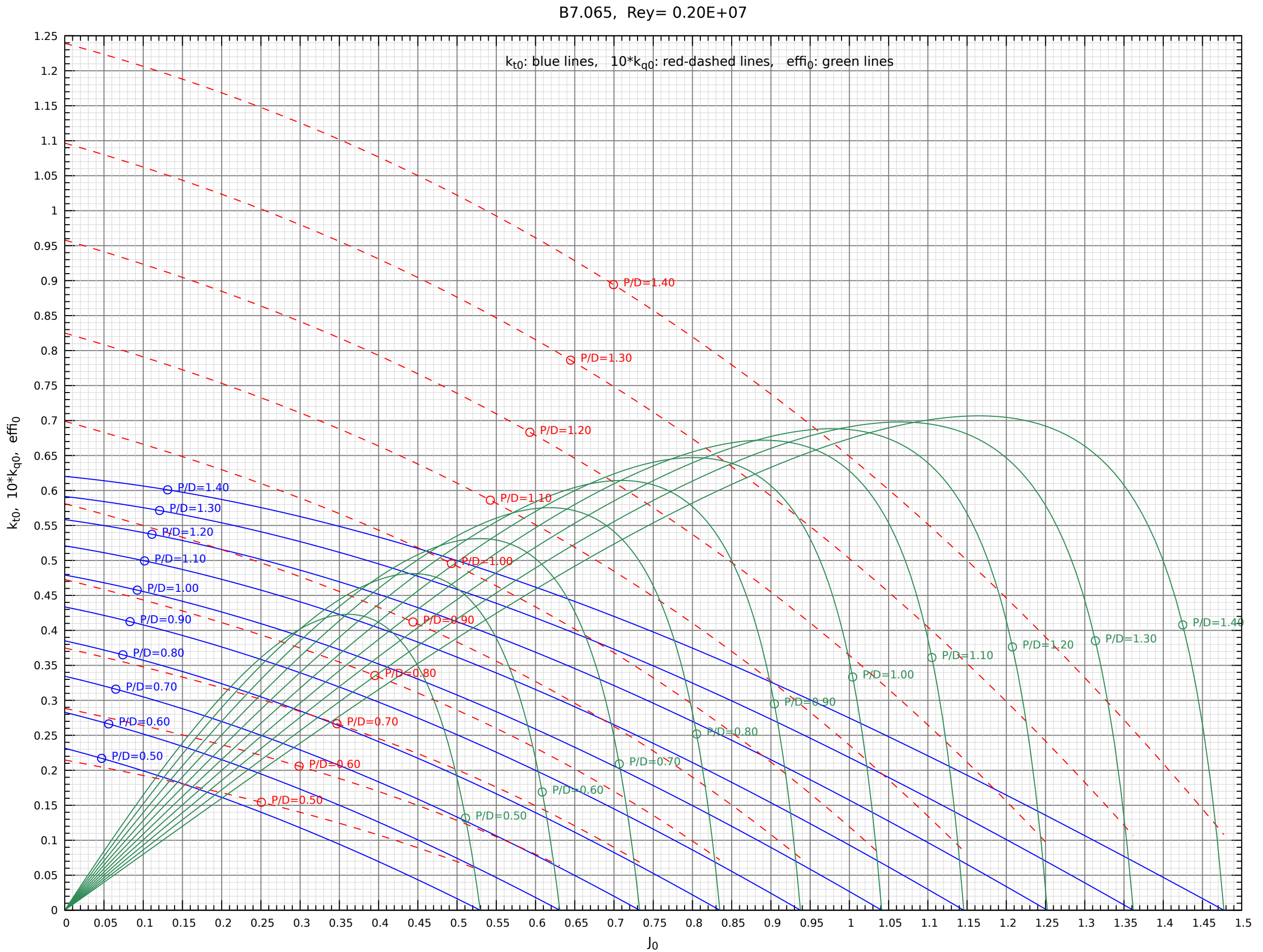
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.060, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0


B7.065, Rey= 0.20E+07
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k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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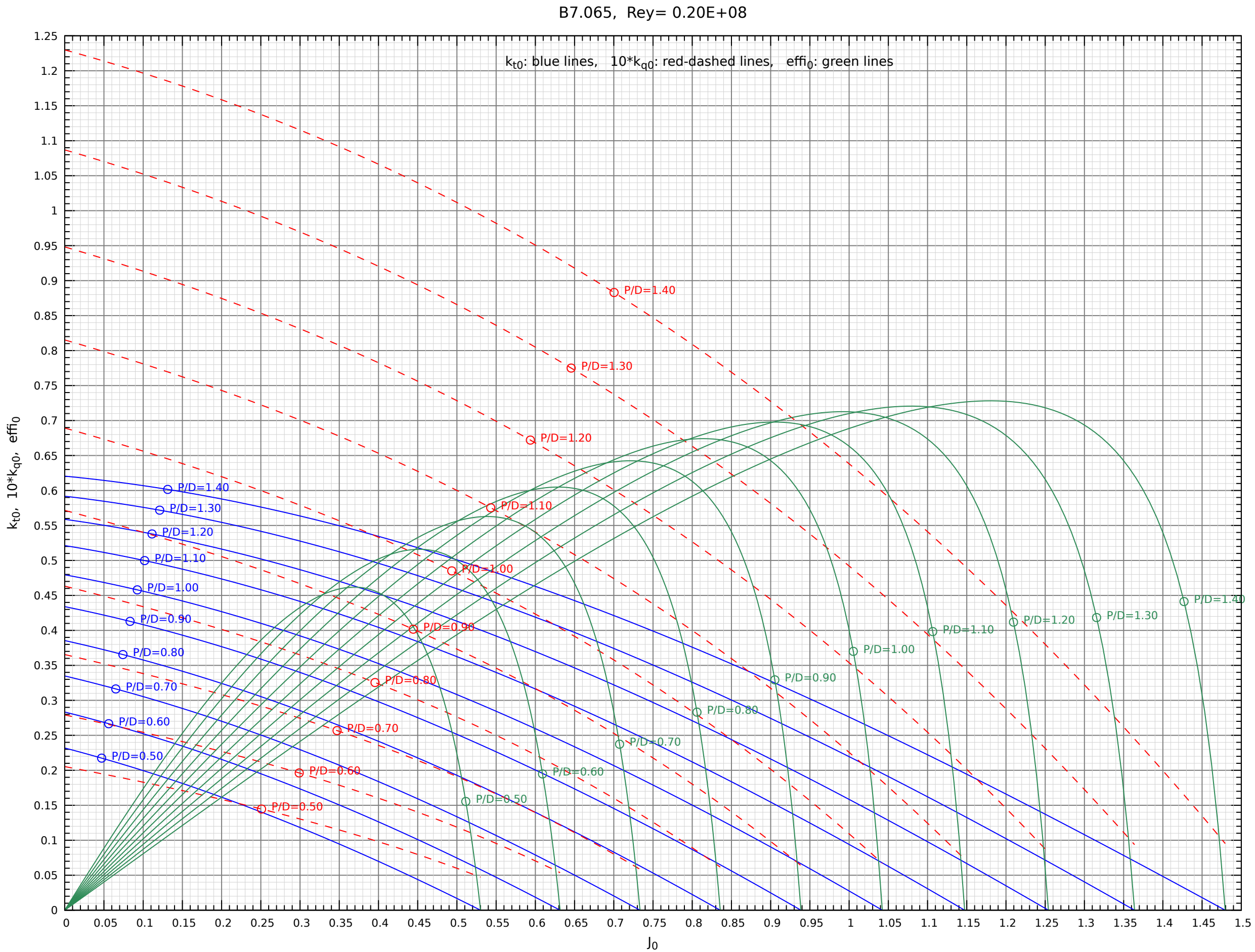
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.065, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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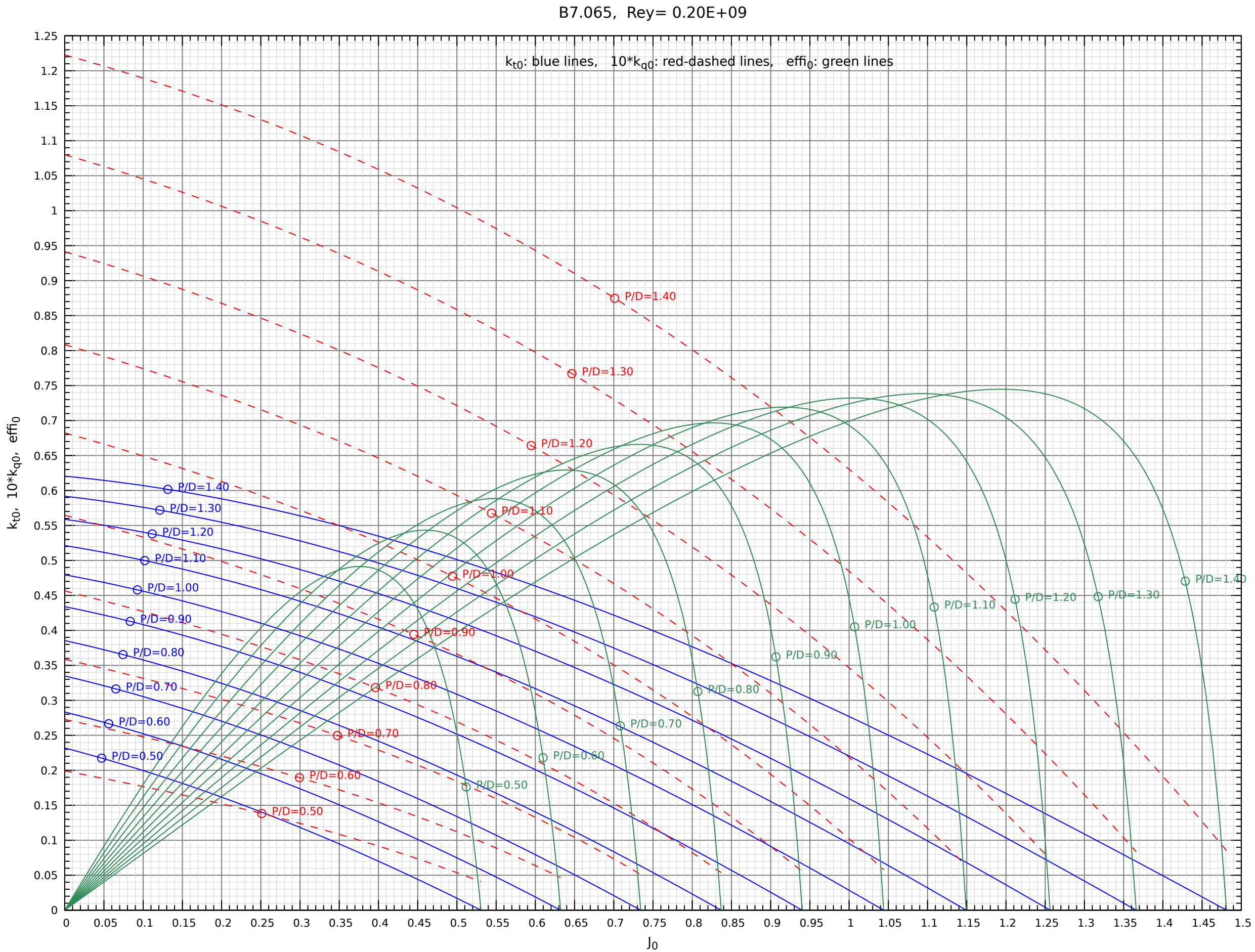
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.065, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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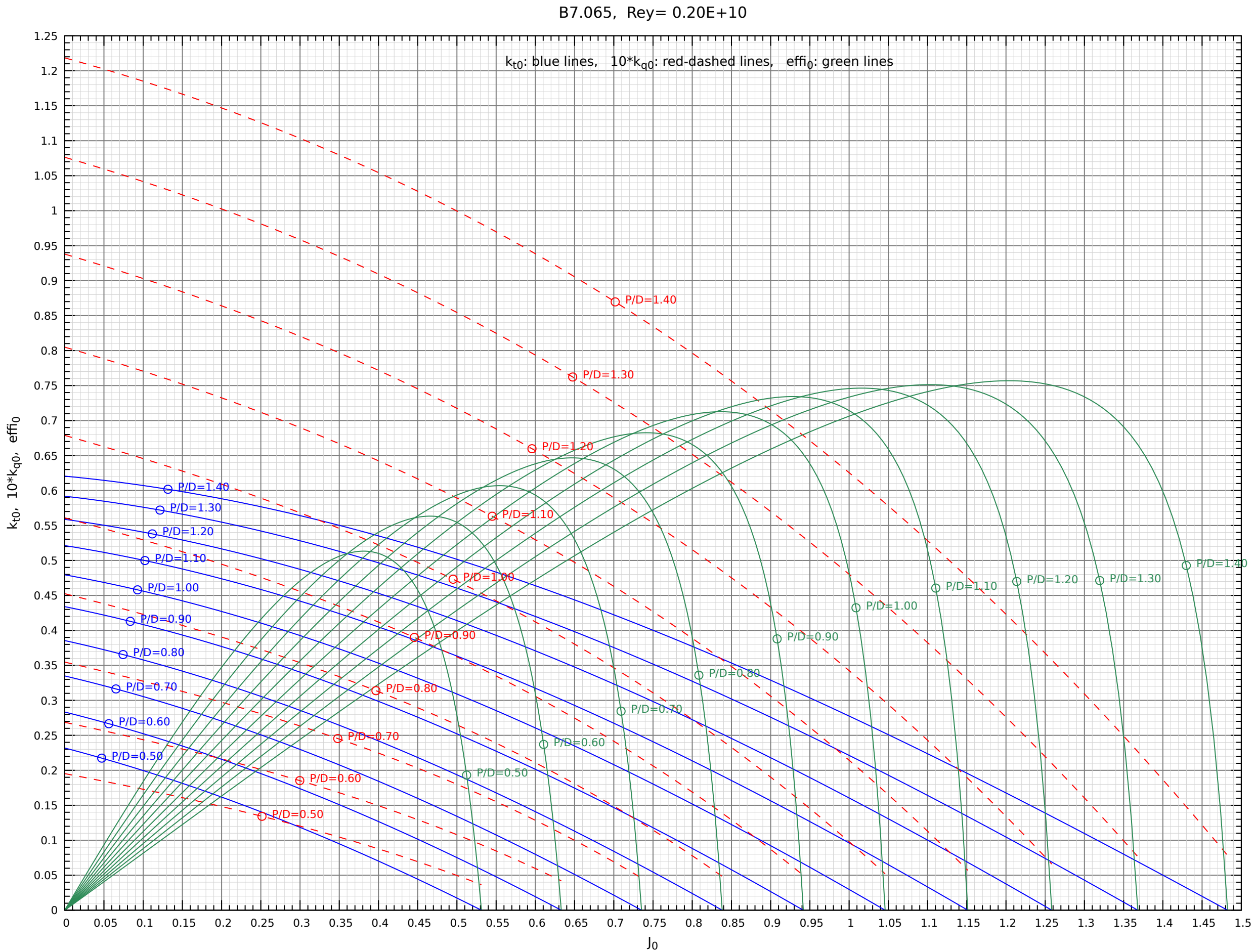
B7.065, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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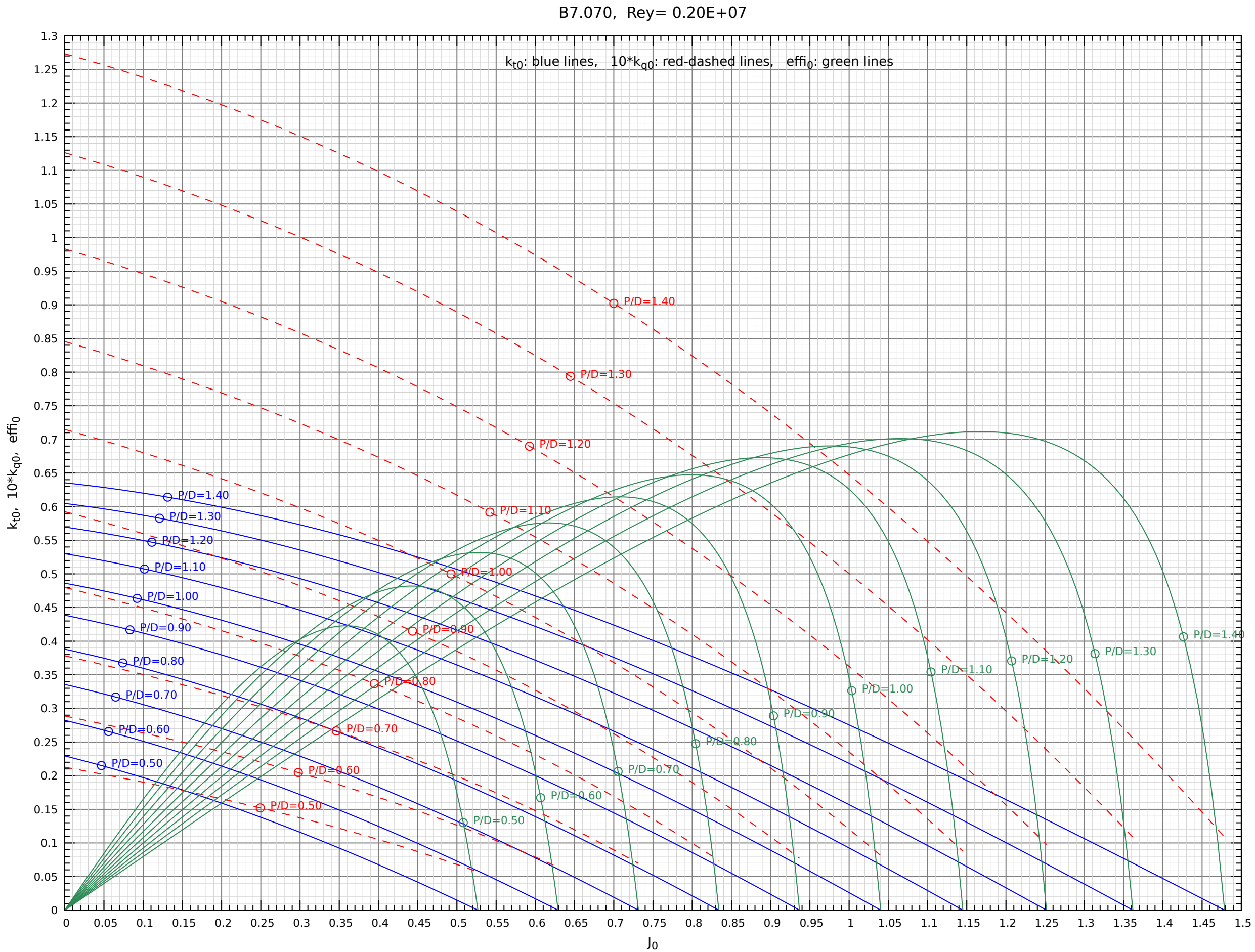
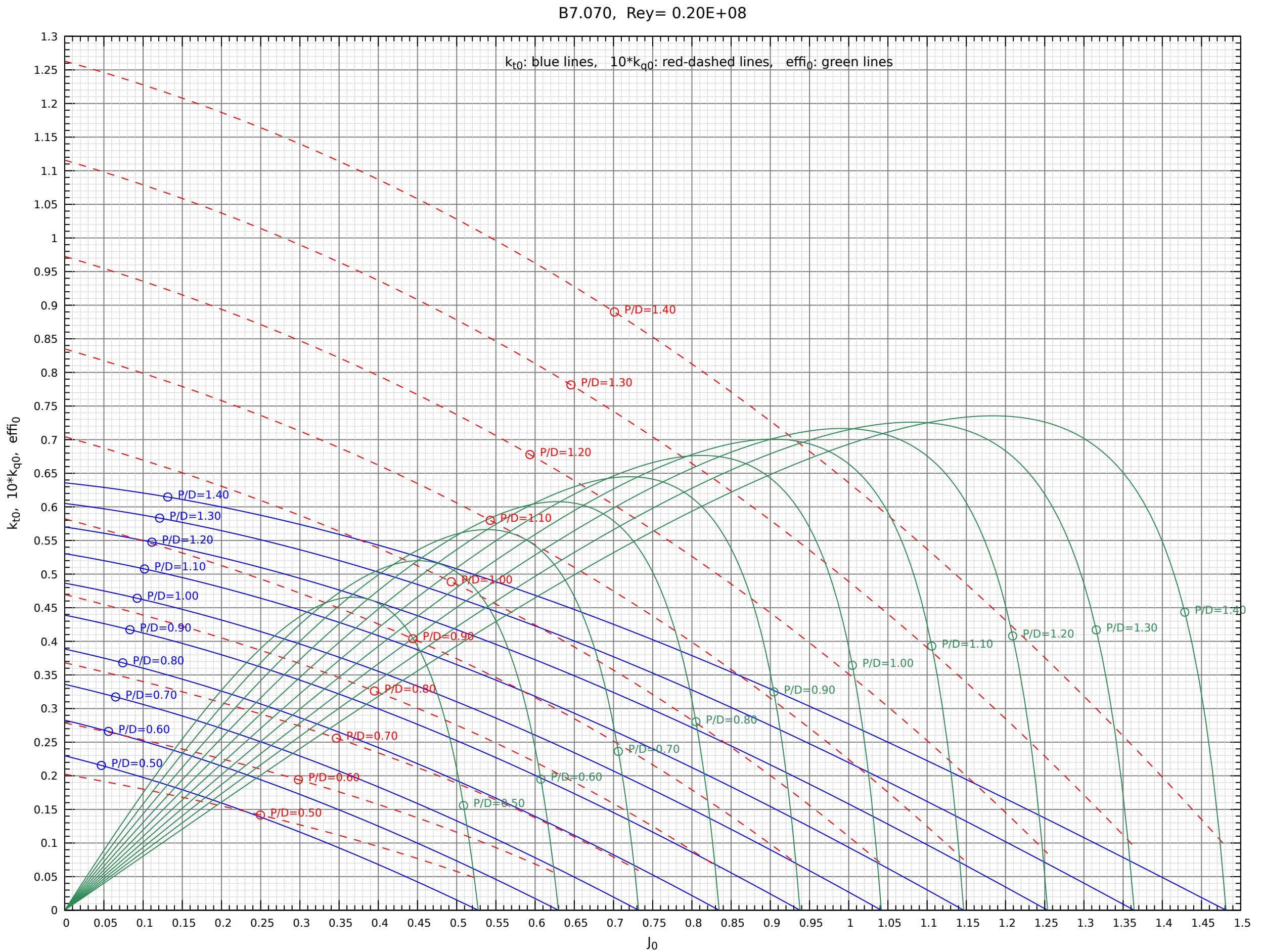
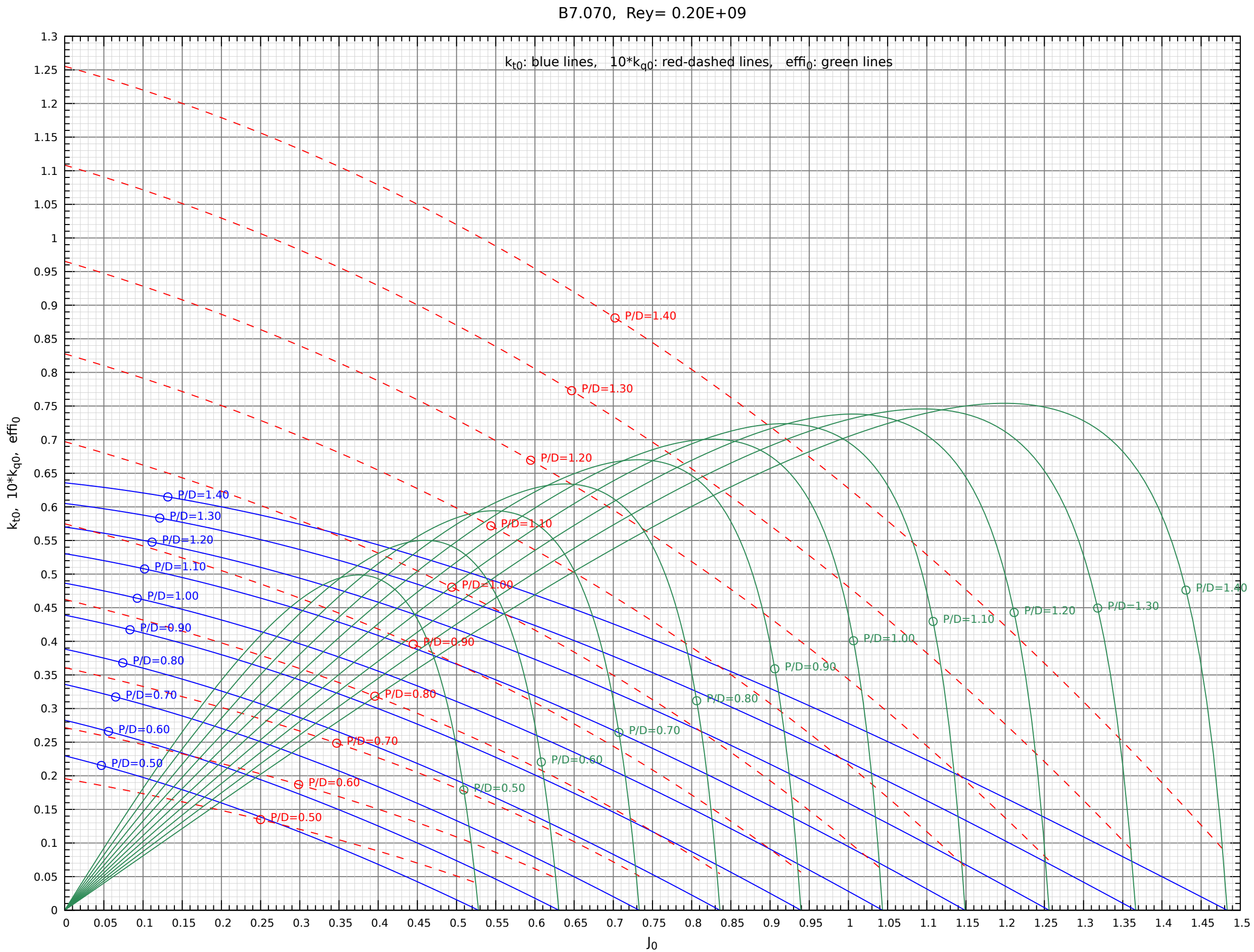
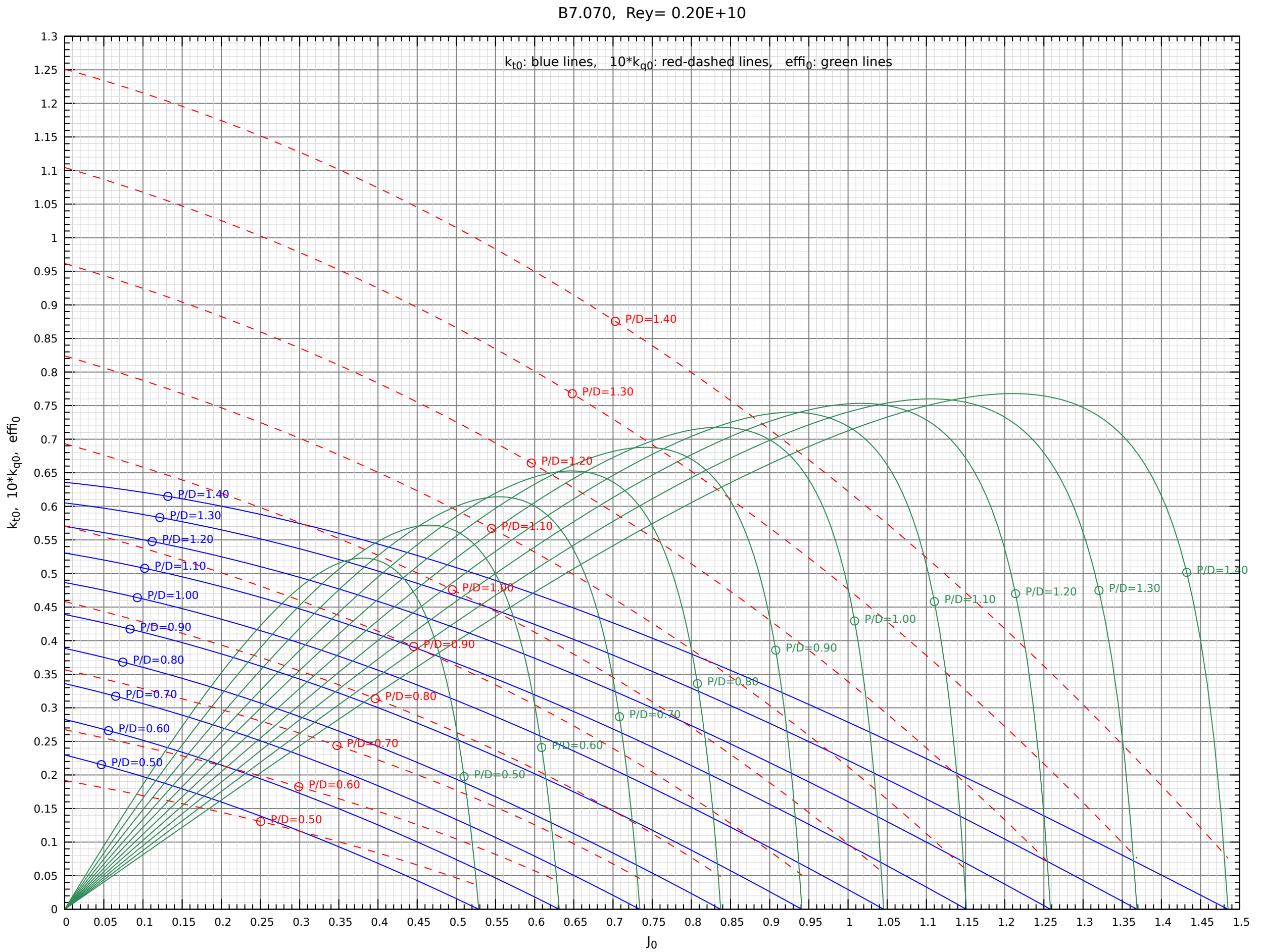
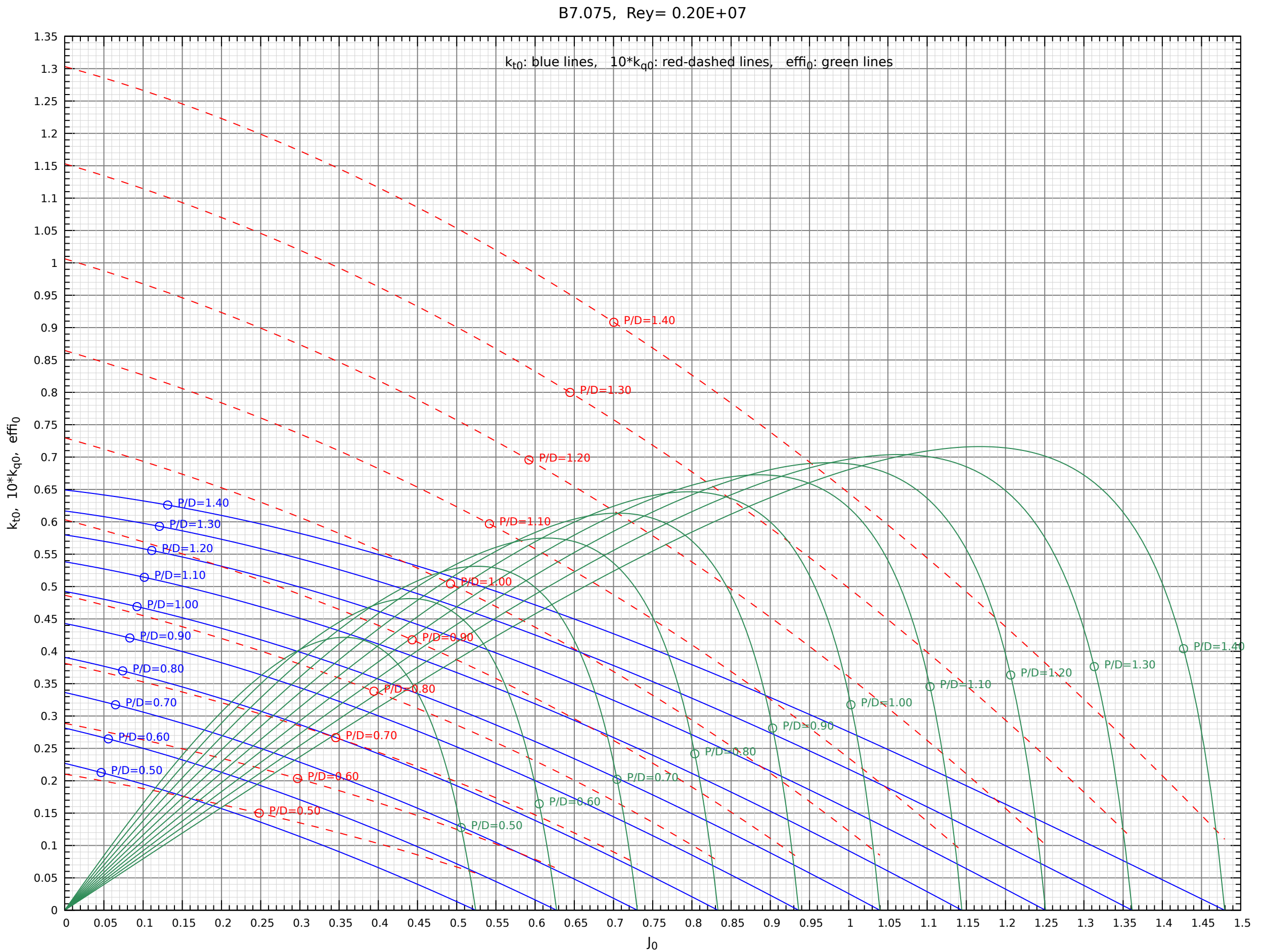
P/D=0.60
P/D=0.50

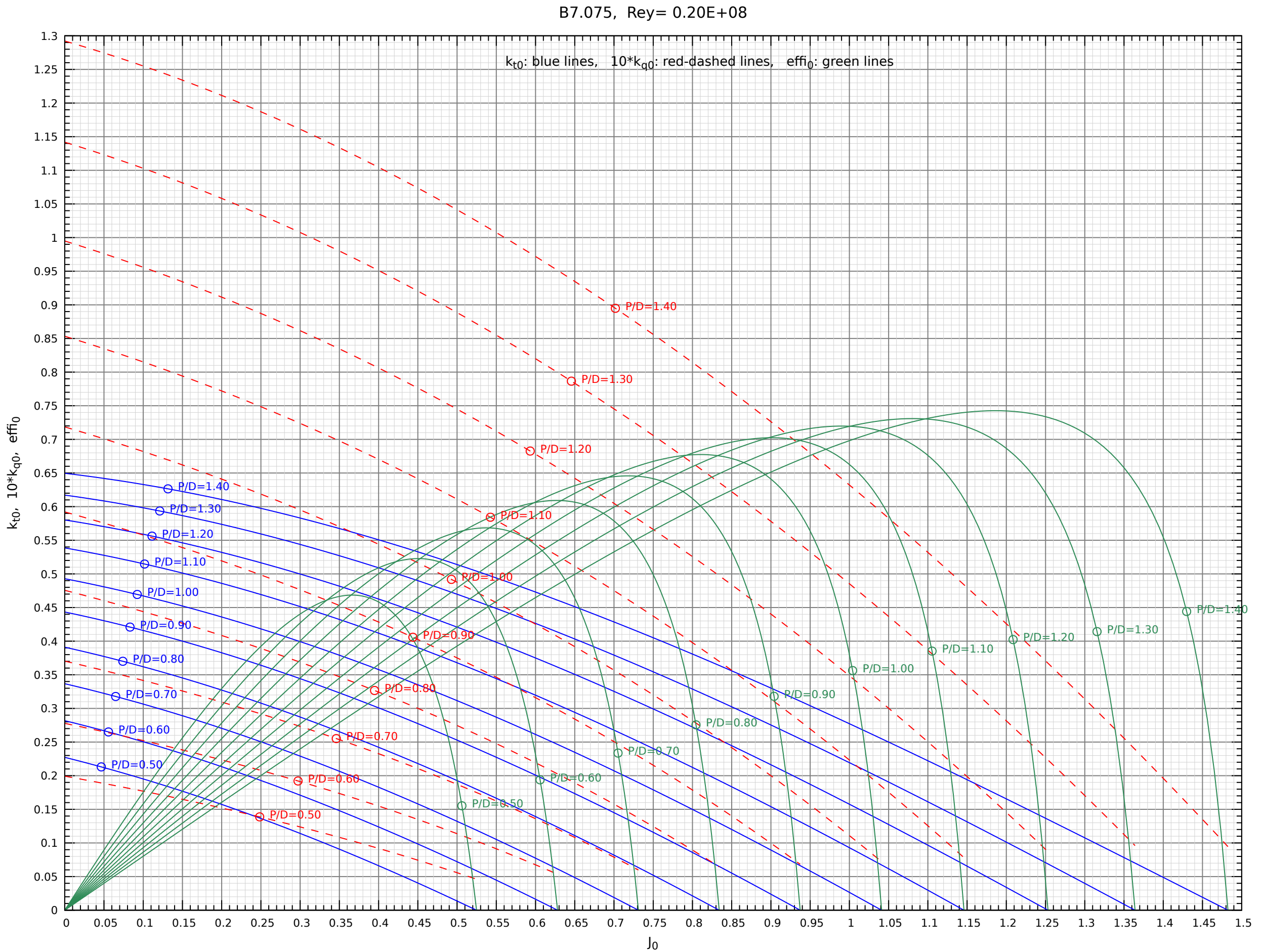

B7.070, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50
k_{t0}, $10*k_{q0}$, $effi_0$
J_0

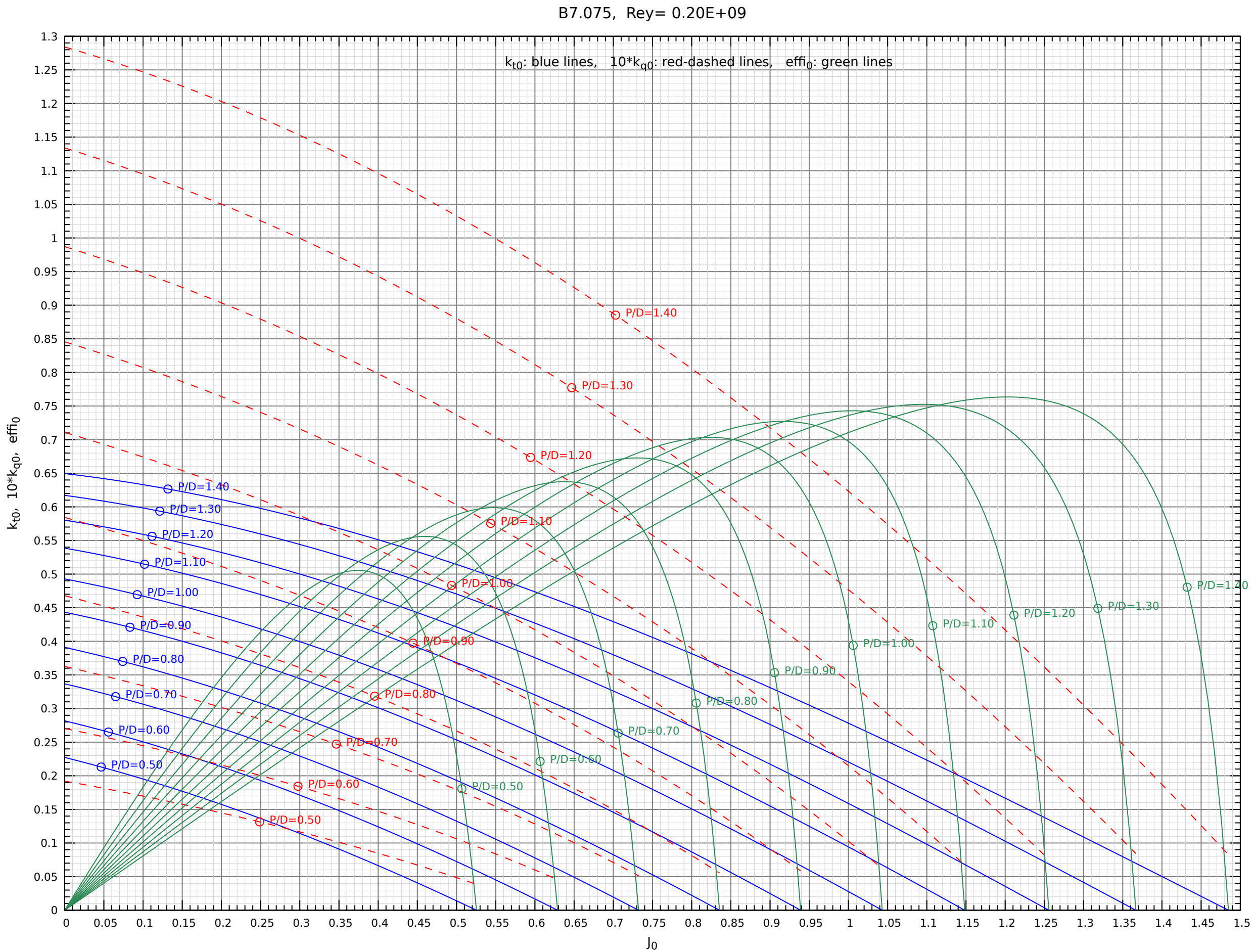

B7.070, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.070, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.070, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.075, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.075, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.075, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
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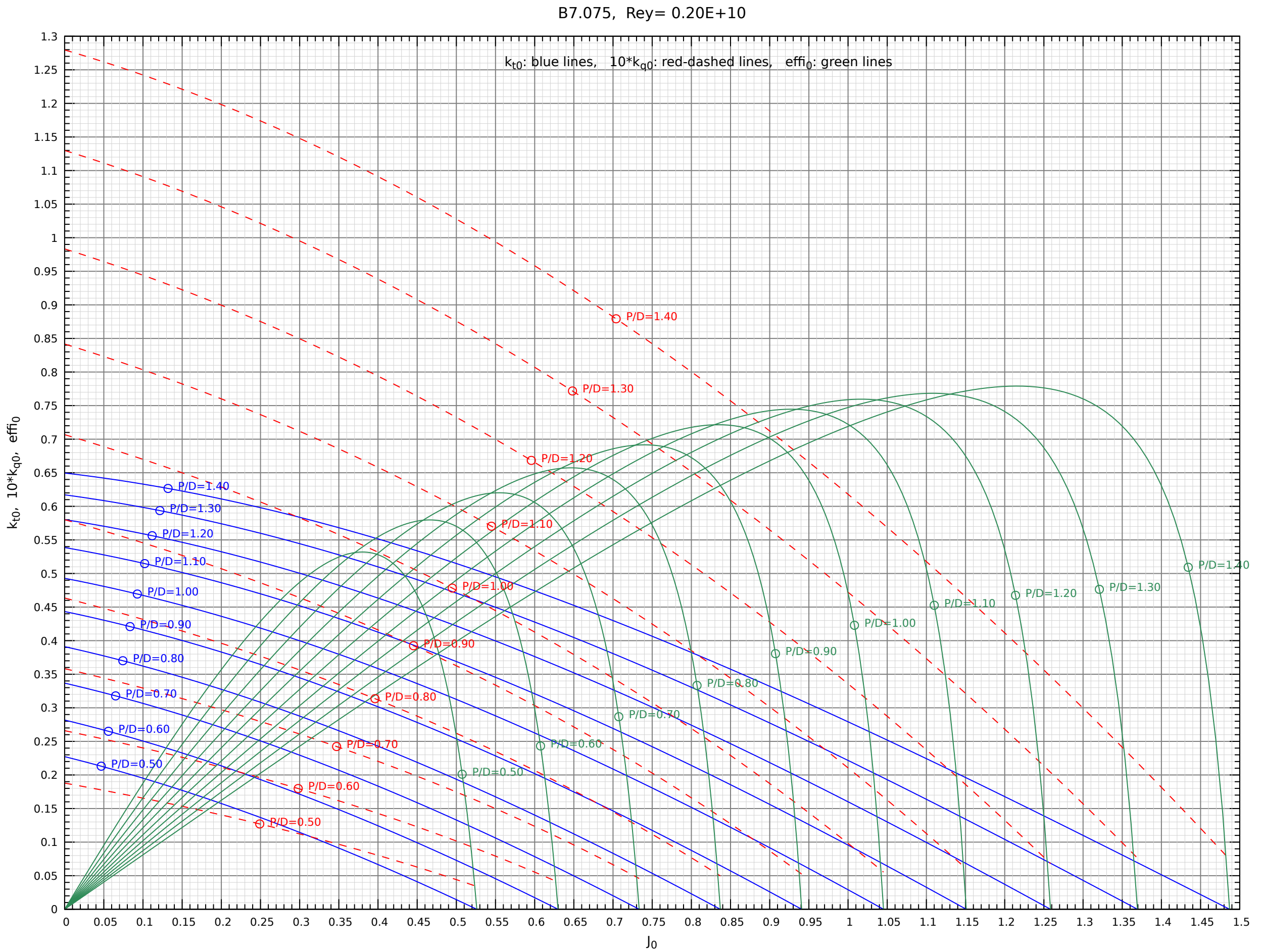
B7.075, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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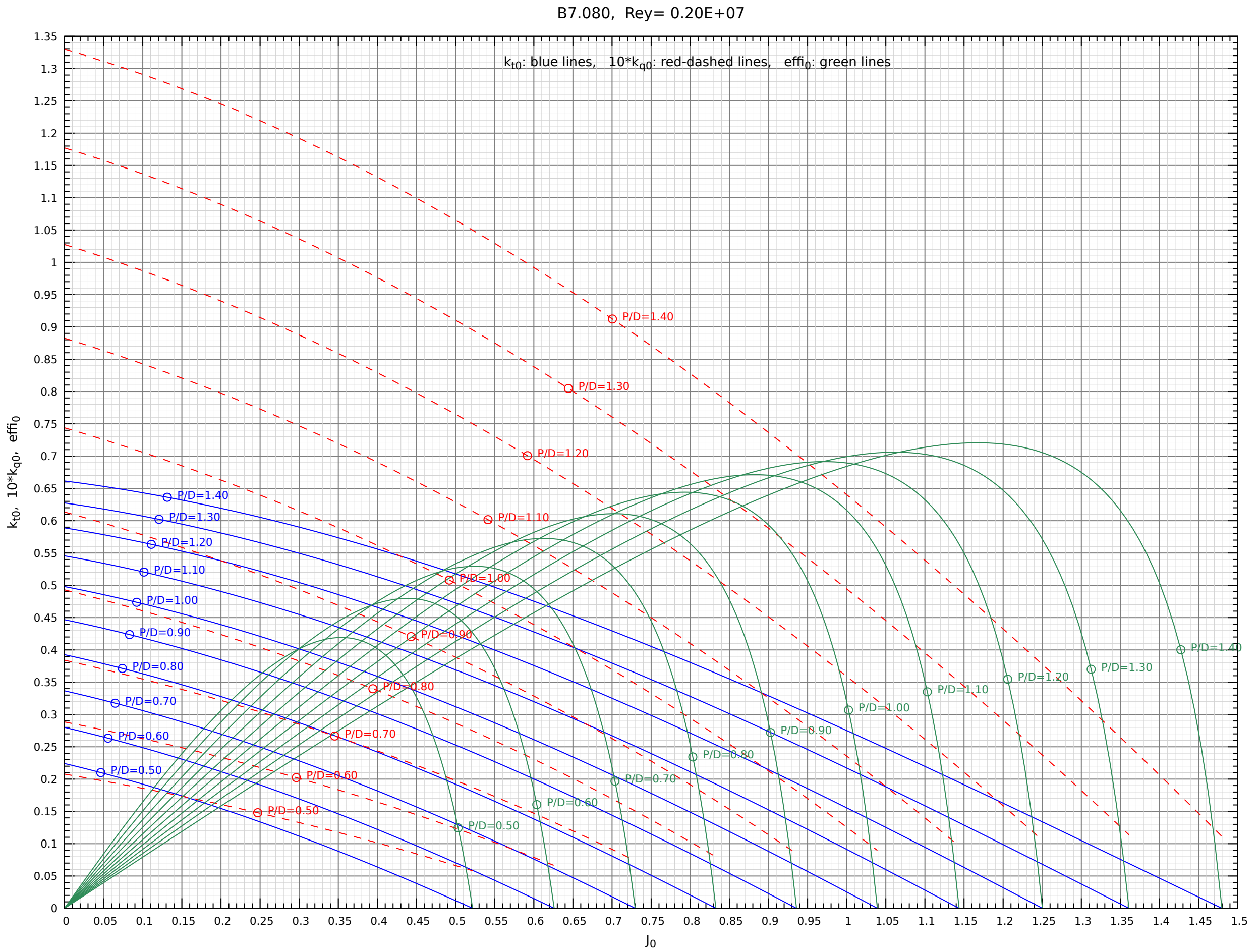
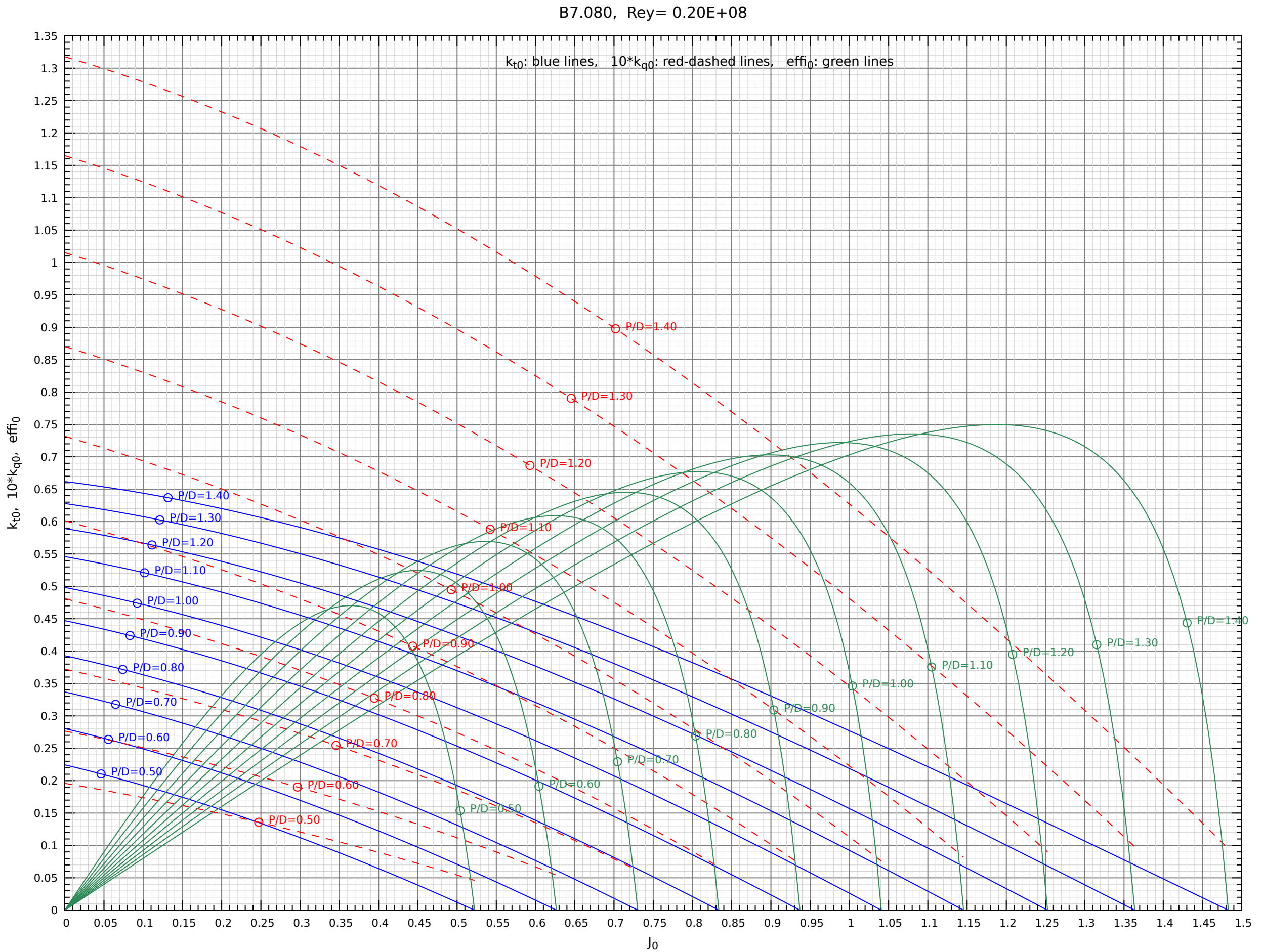
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.080, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.080, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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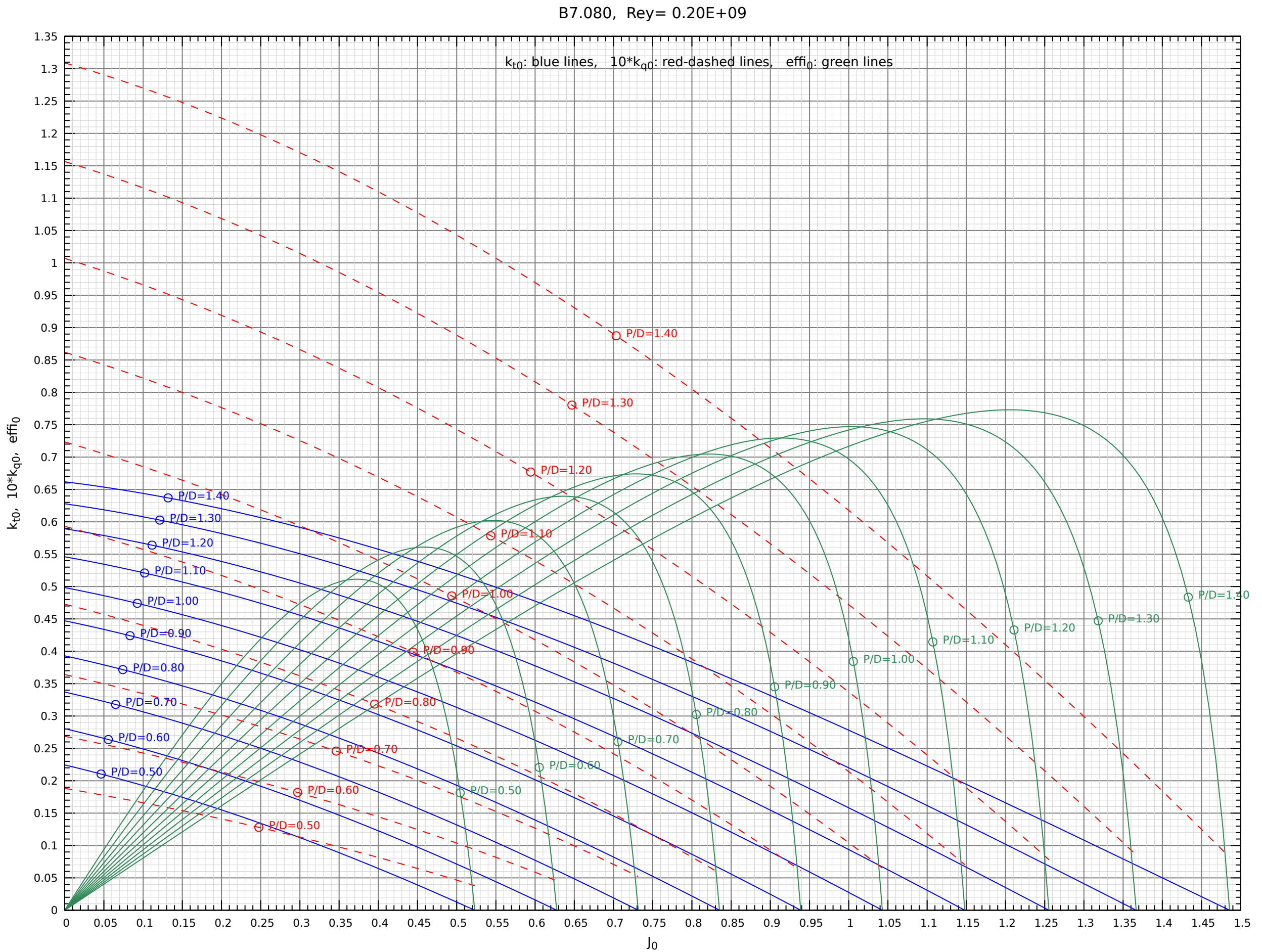
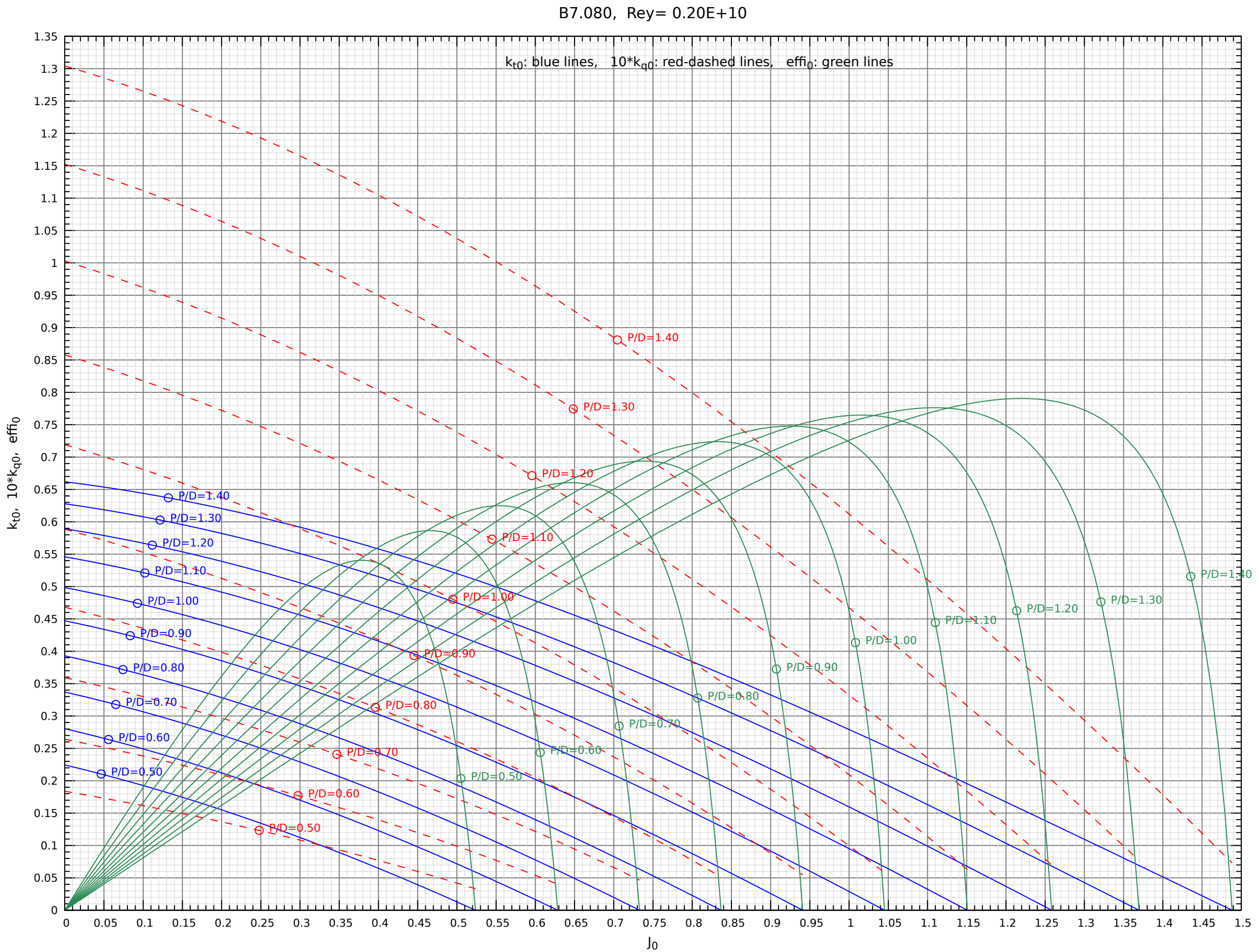
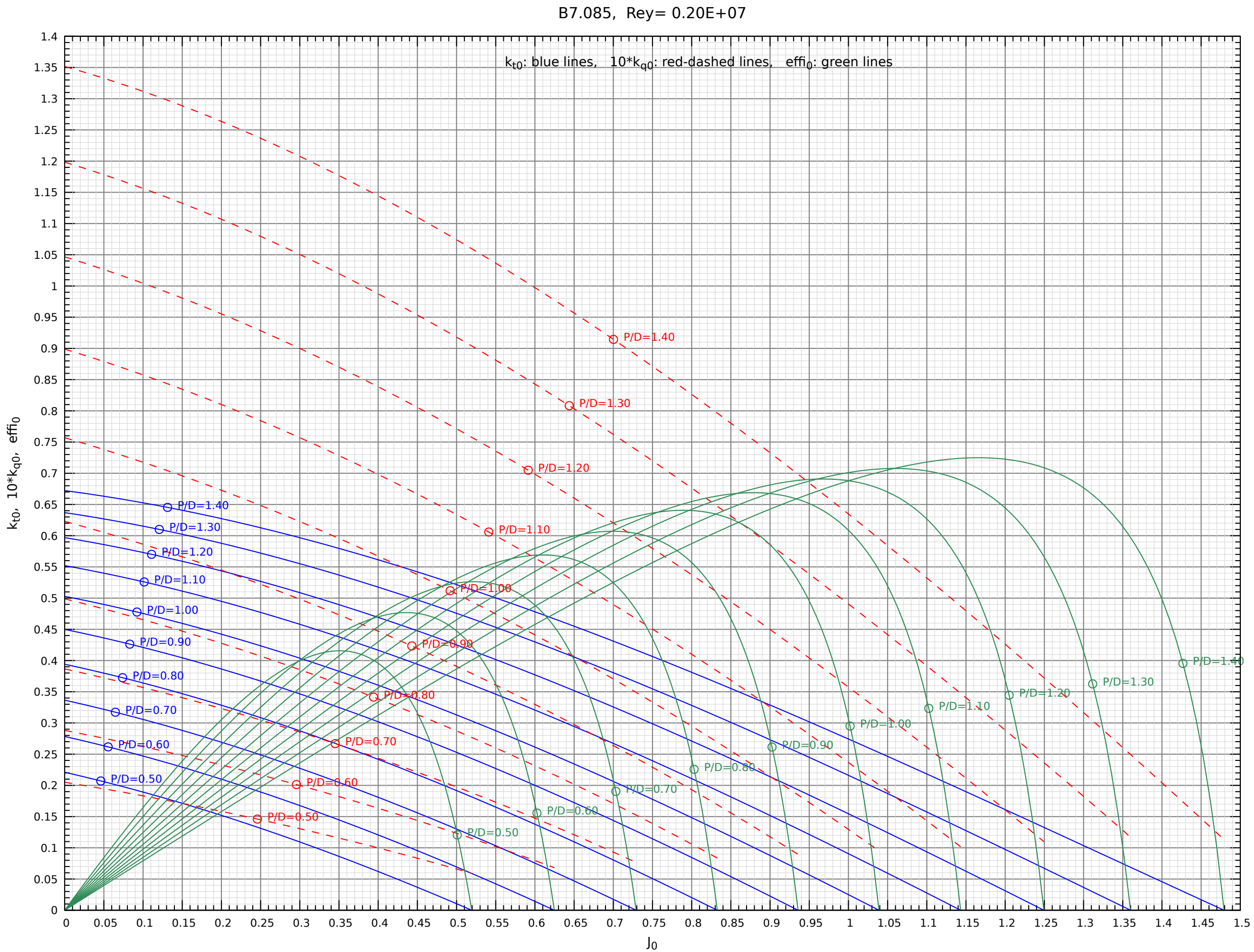
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.080, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.080, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.085, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
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P/D=1.40
P/D=1.30
P/D=1.20
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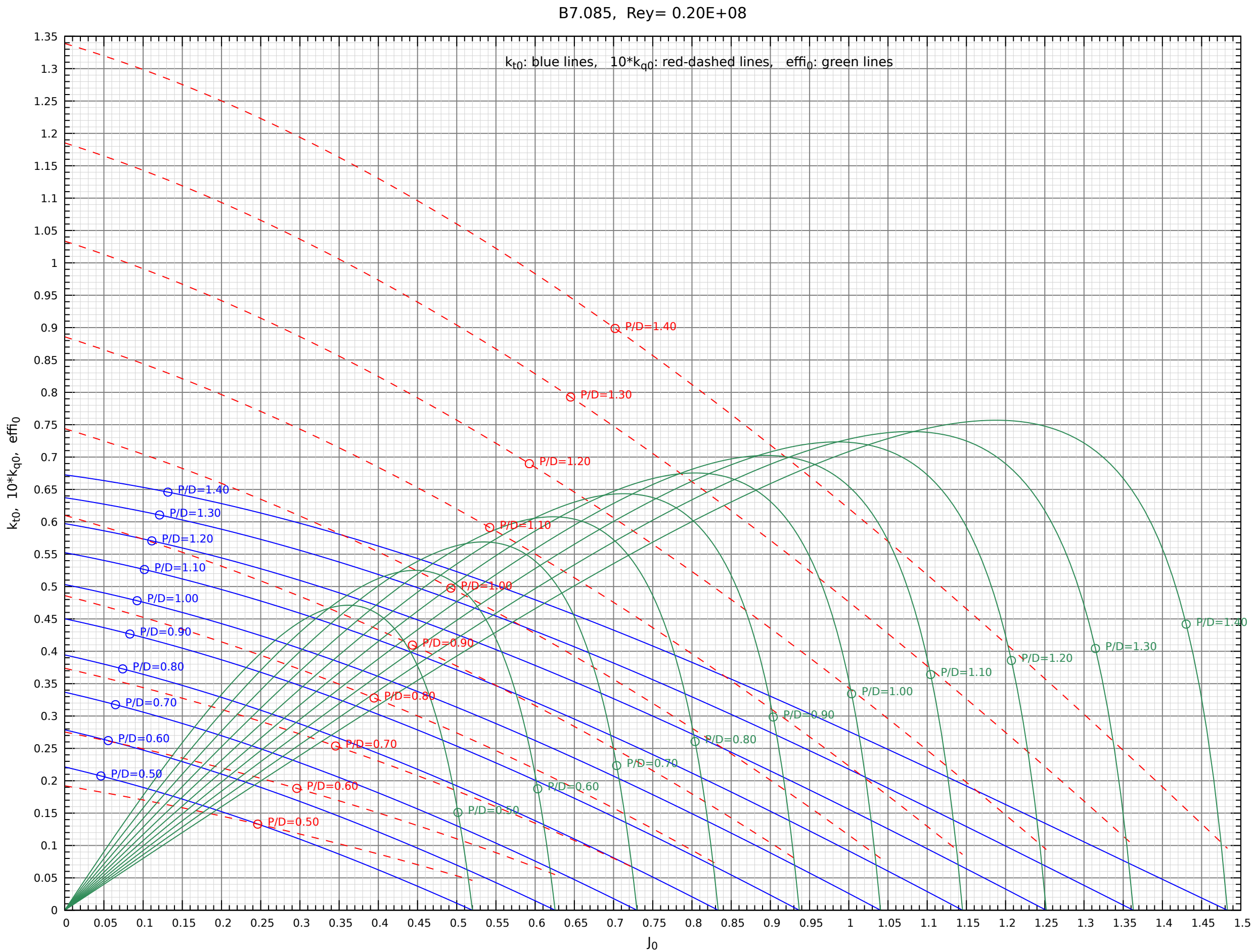
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.085, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
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P/D=0.80
P/D=0.70
P/D=0.60
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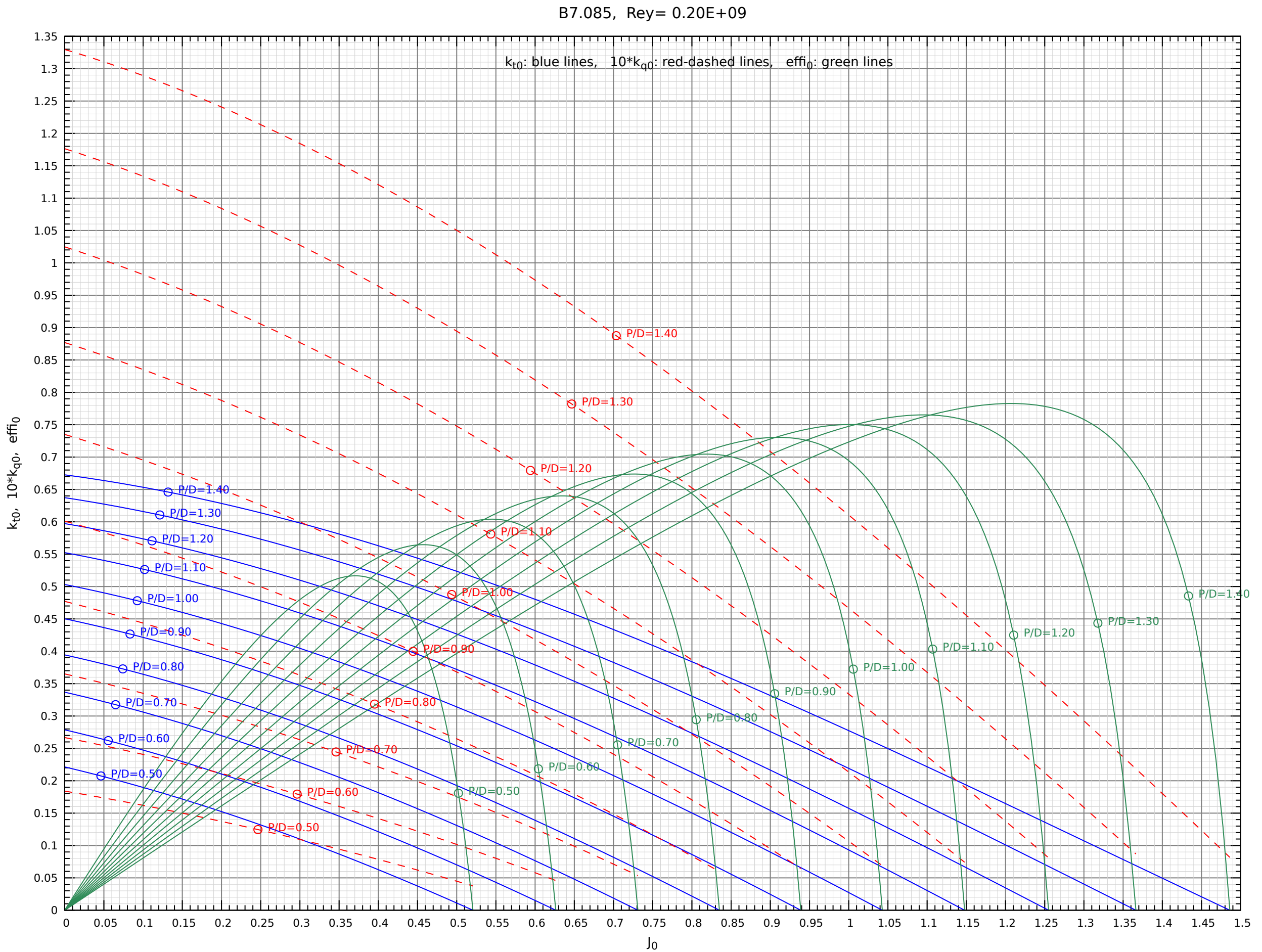
B7.085, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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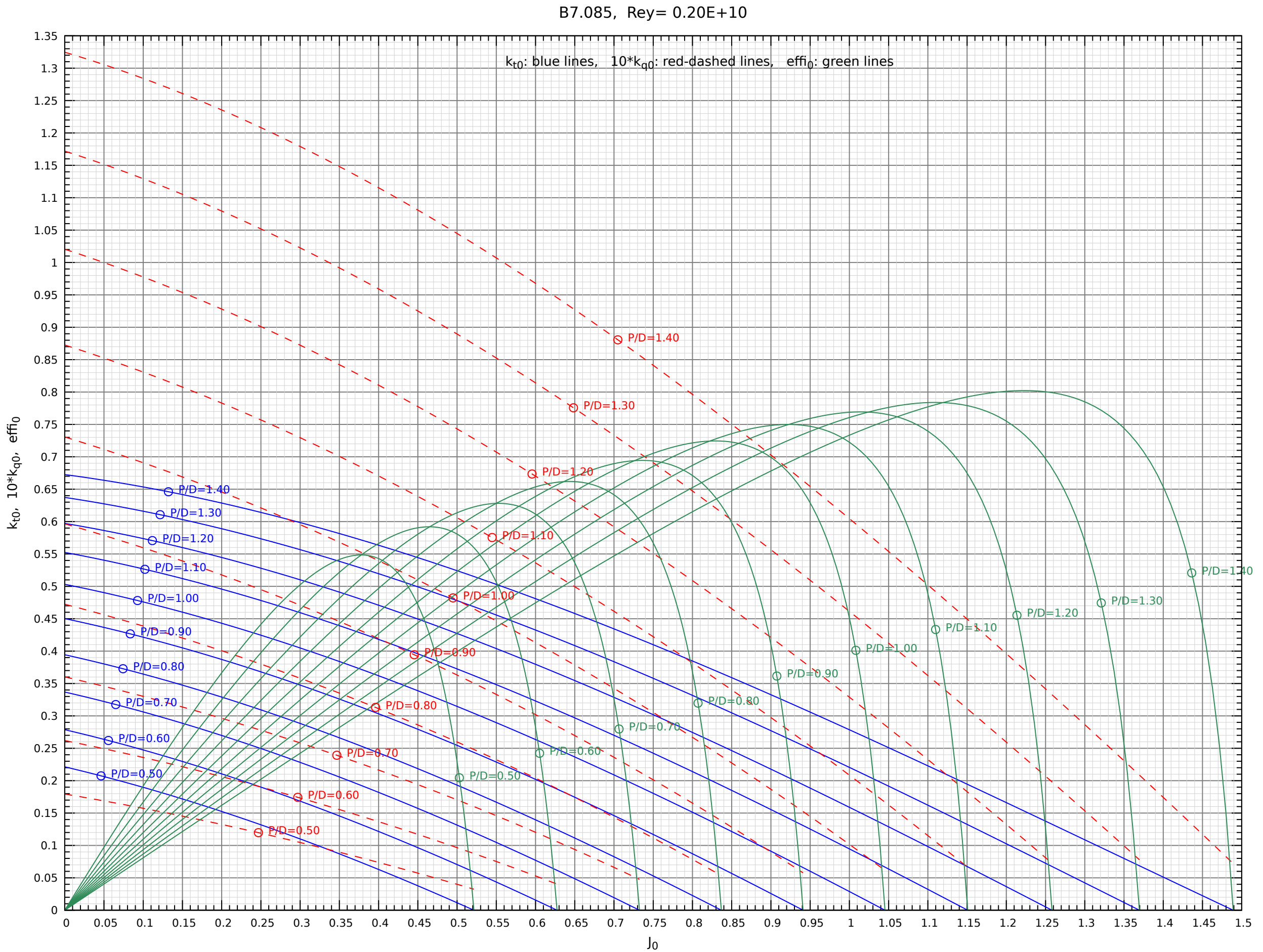
B7.085, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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P/D=0.60
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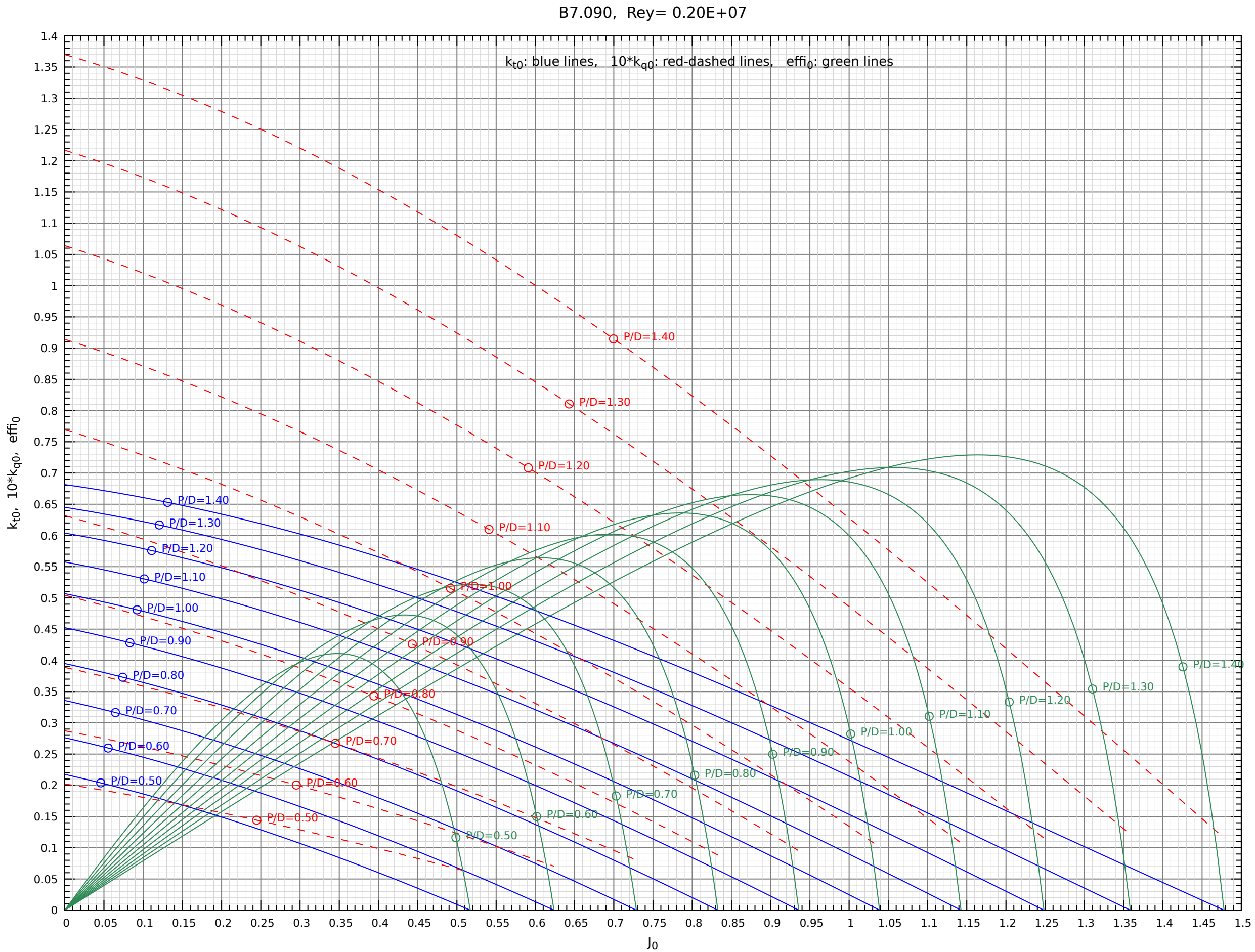
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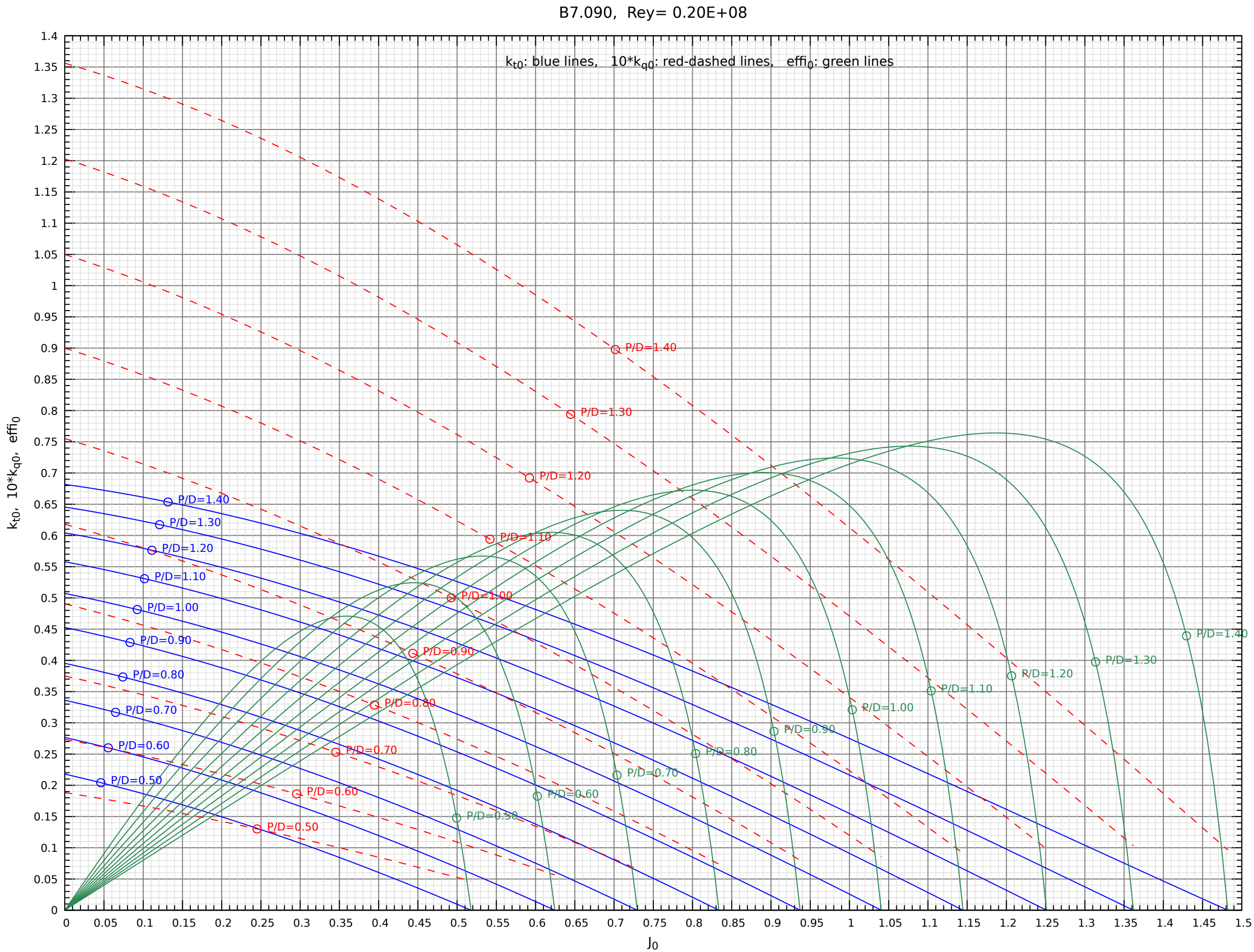
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.80
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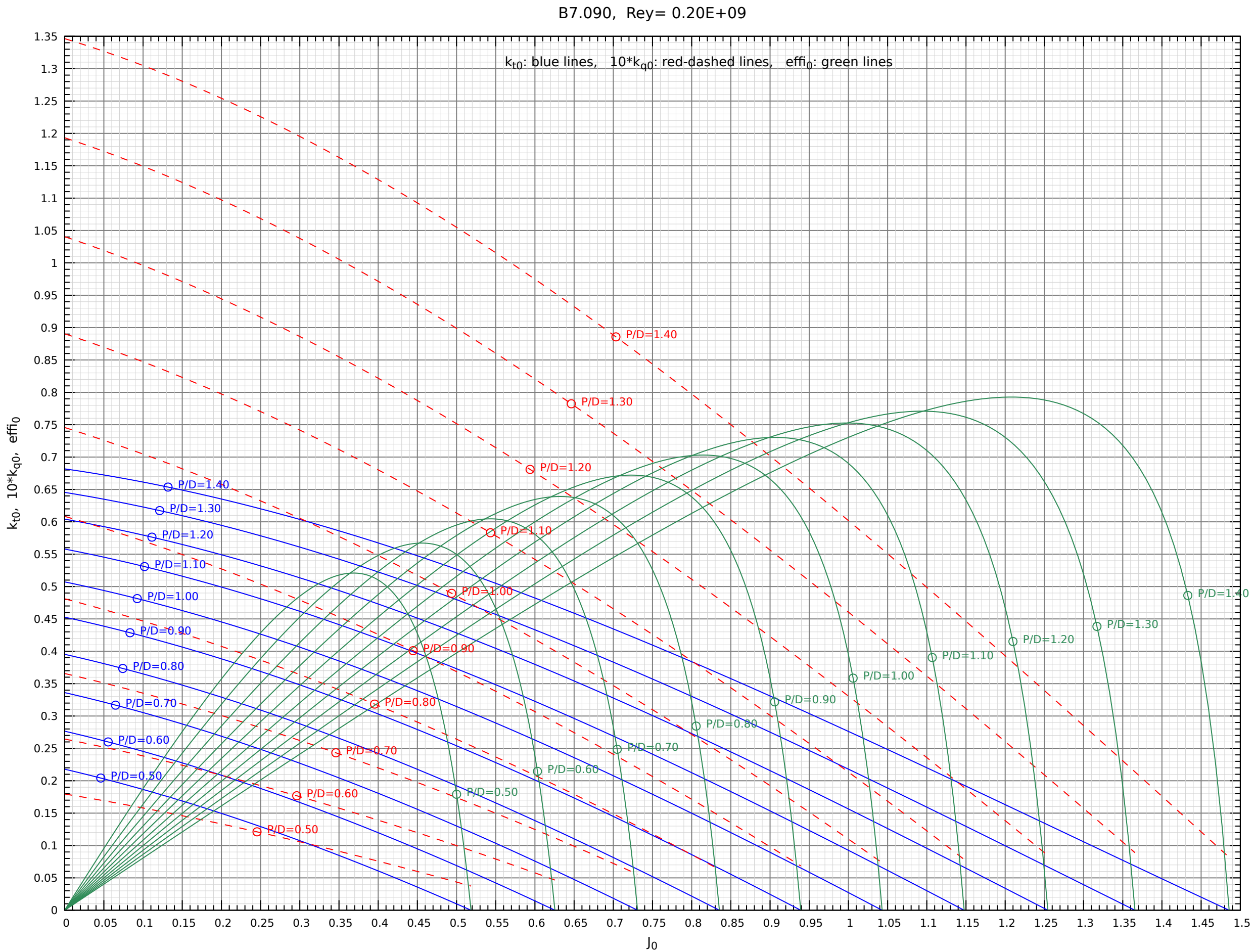
P/D=0.60
P/D=0.50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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.60
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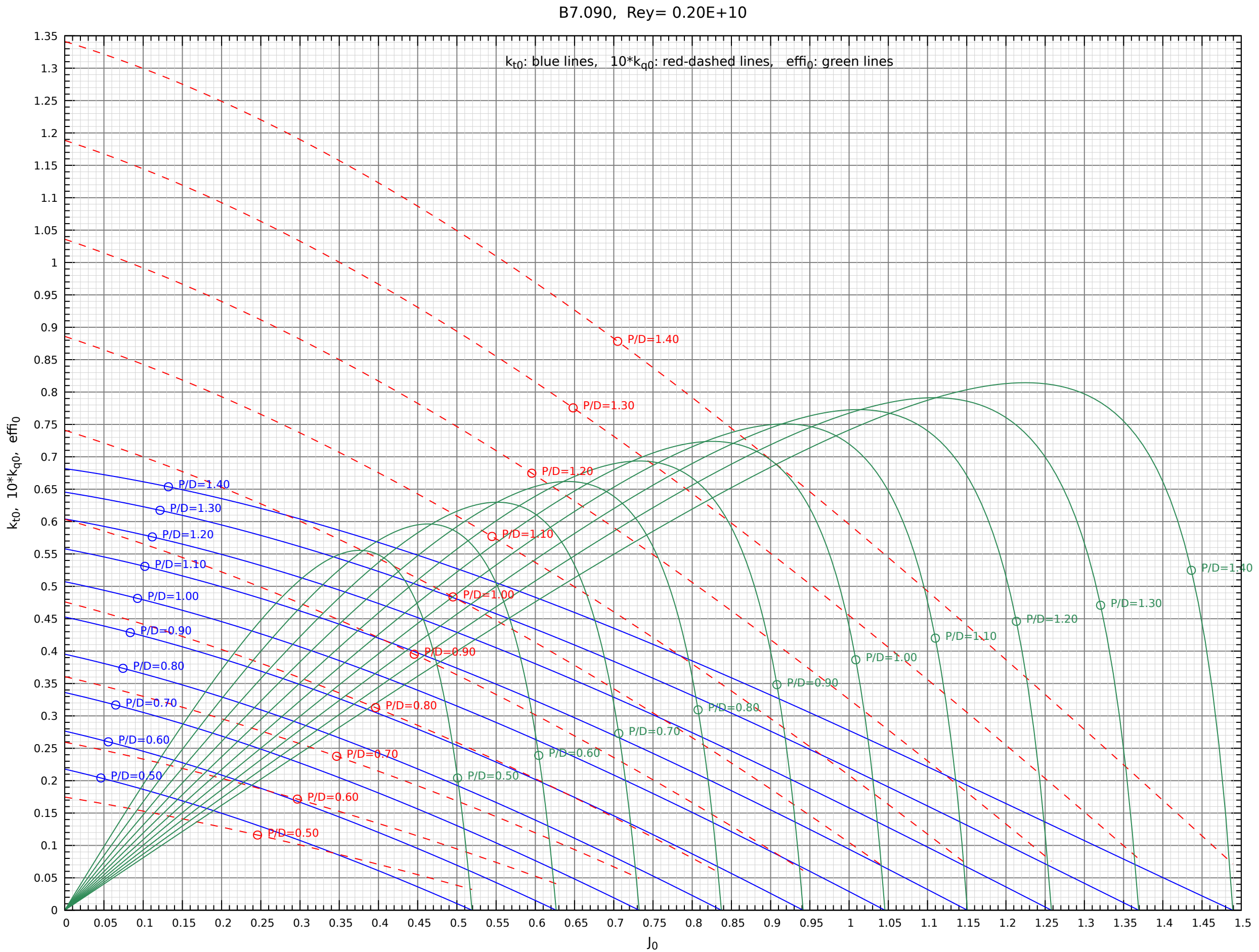
B7.090, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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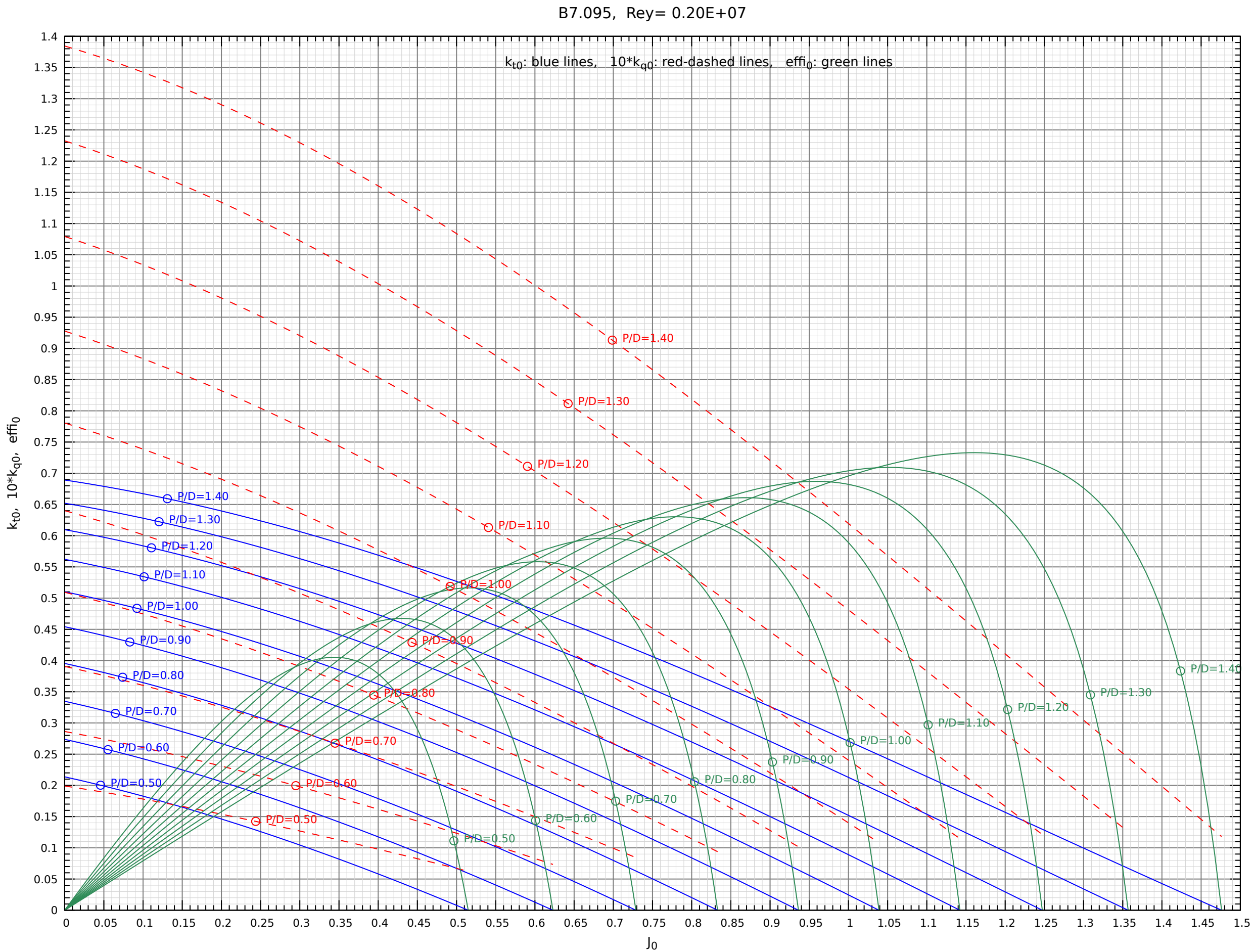
B7.095, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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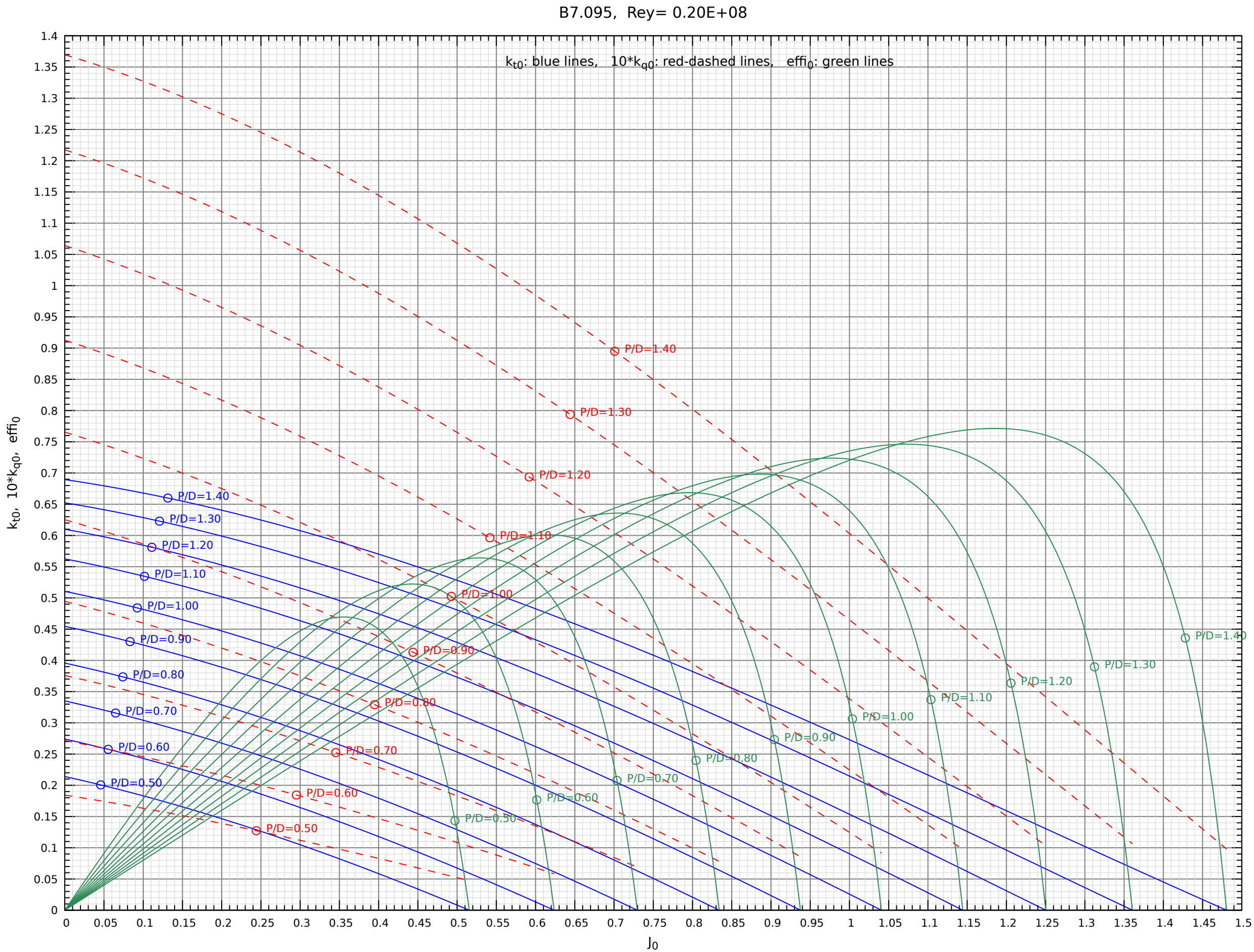
B7.095, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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P/D=0.60
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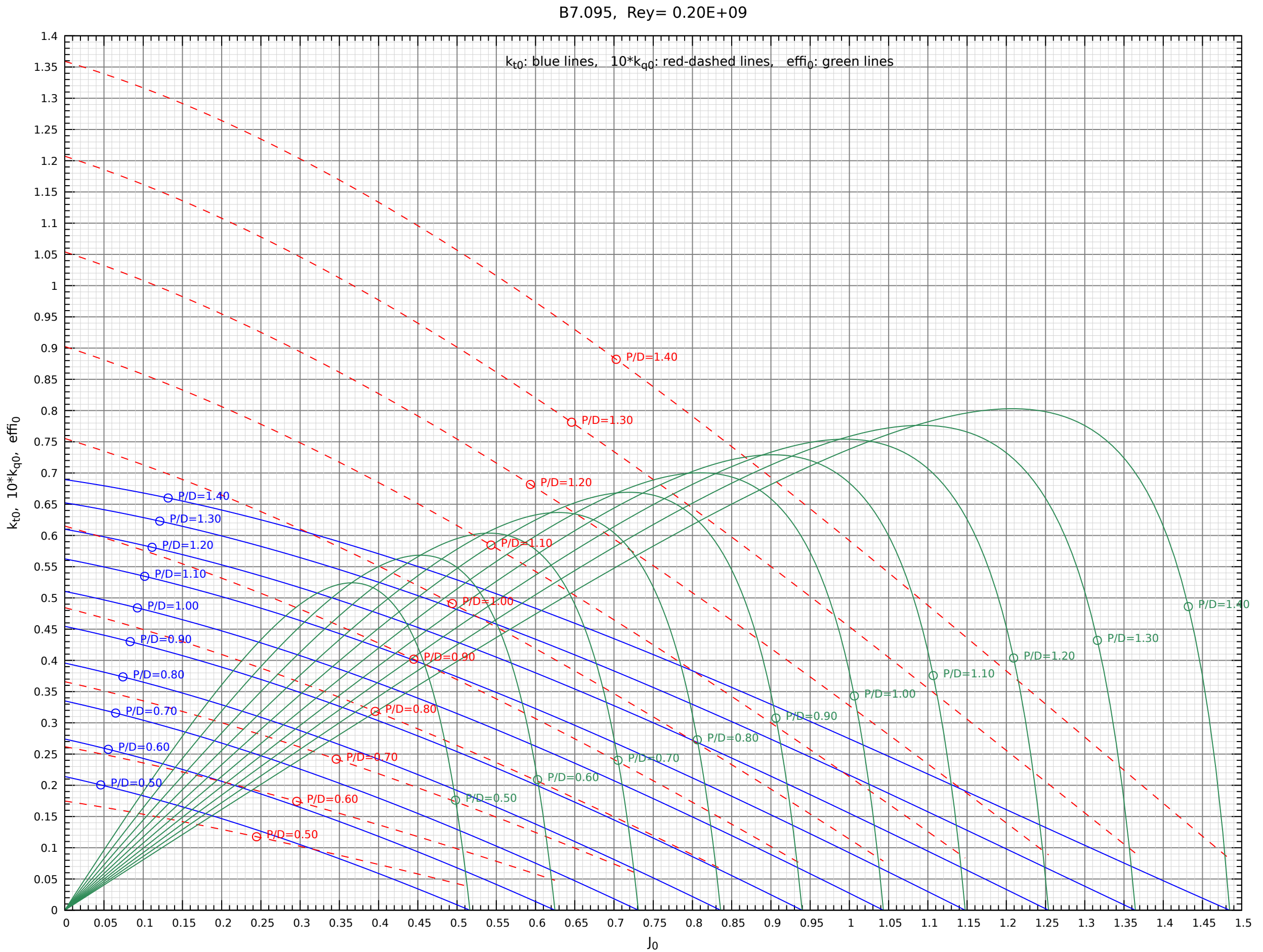
B7.095, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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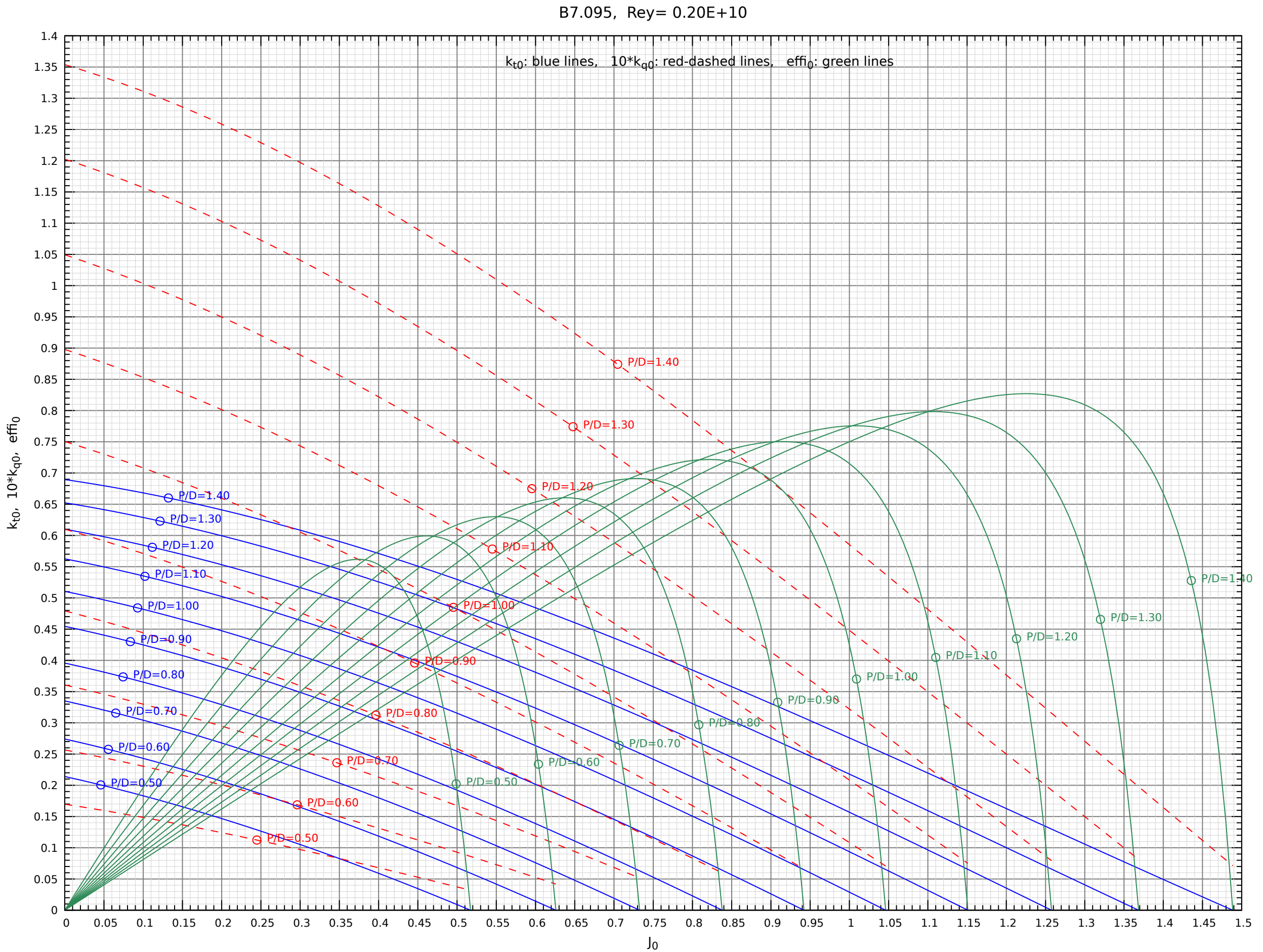
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.095, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
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P/D=1.20
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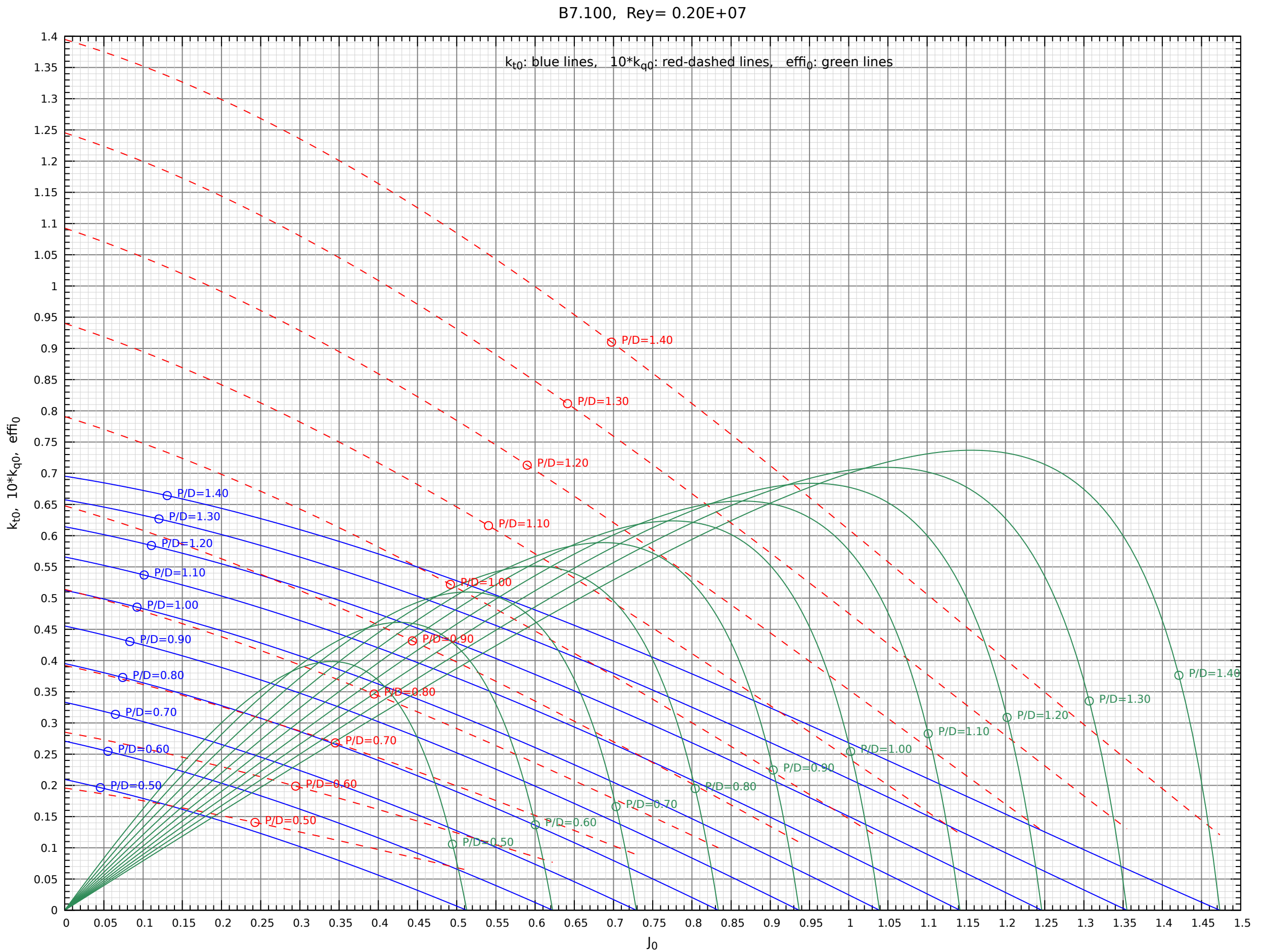
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k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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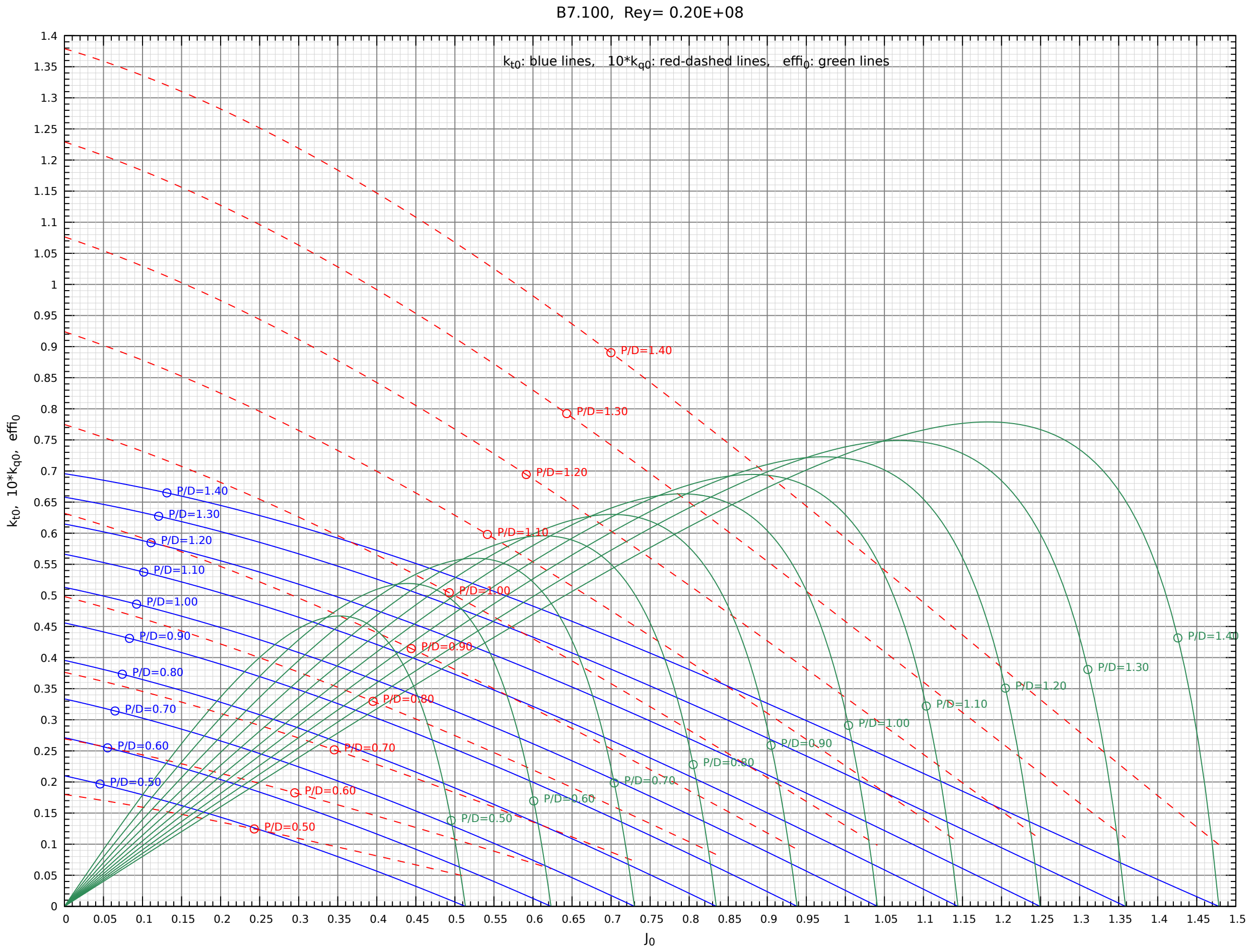
B7.100, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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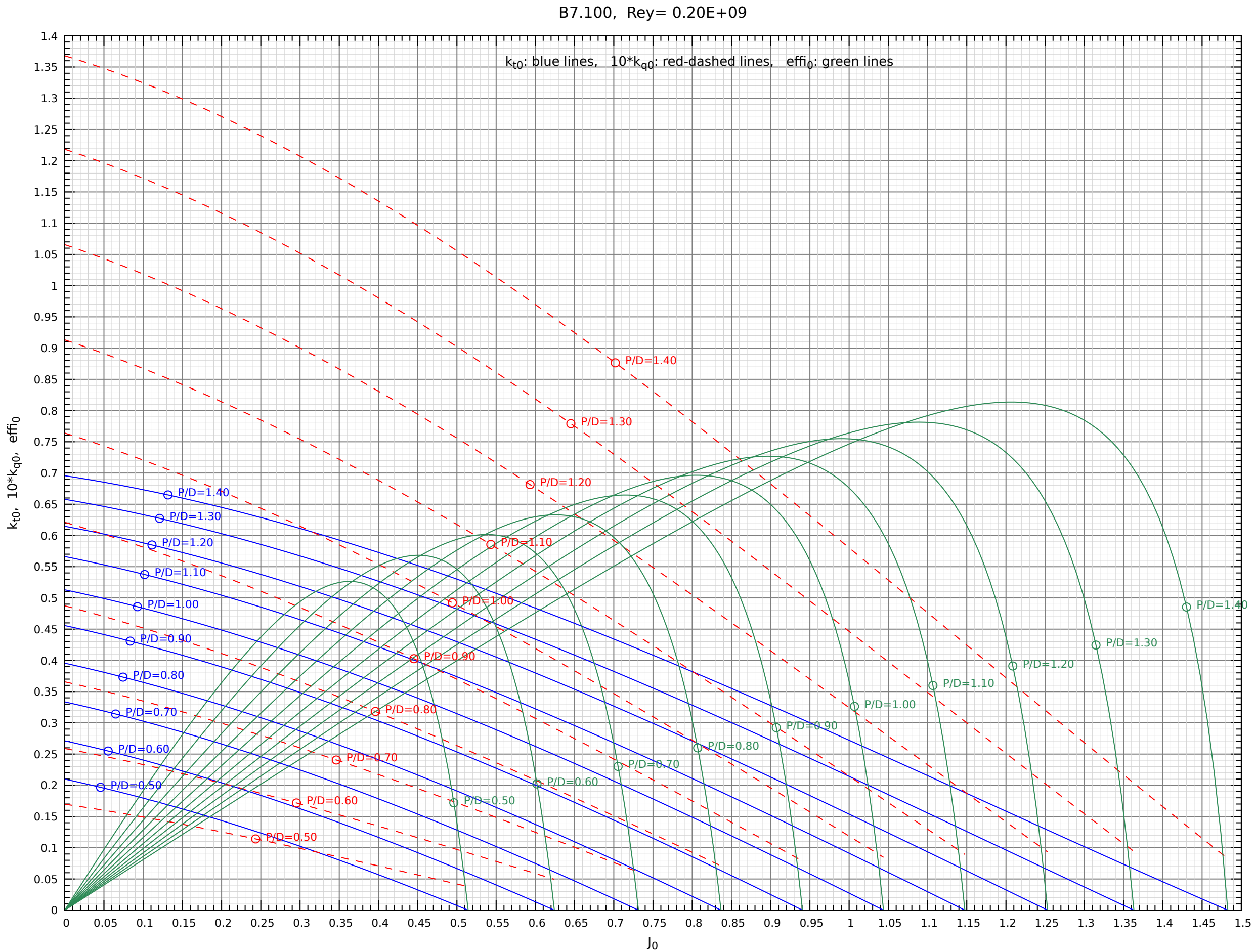
B7.100, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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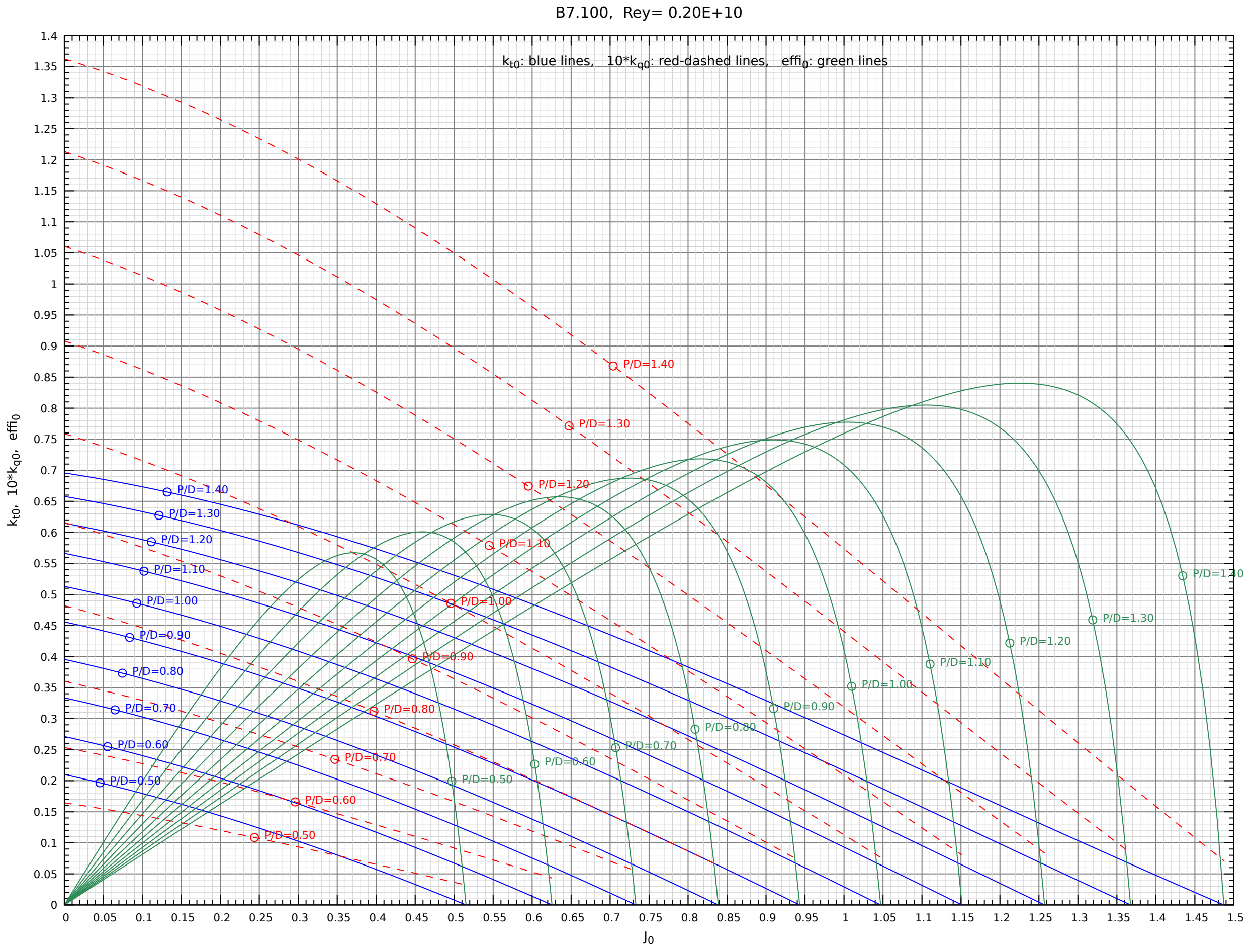
B7.100, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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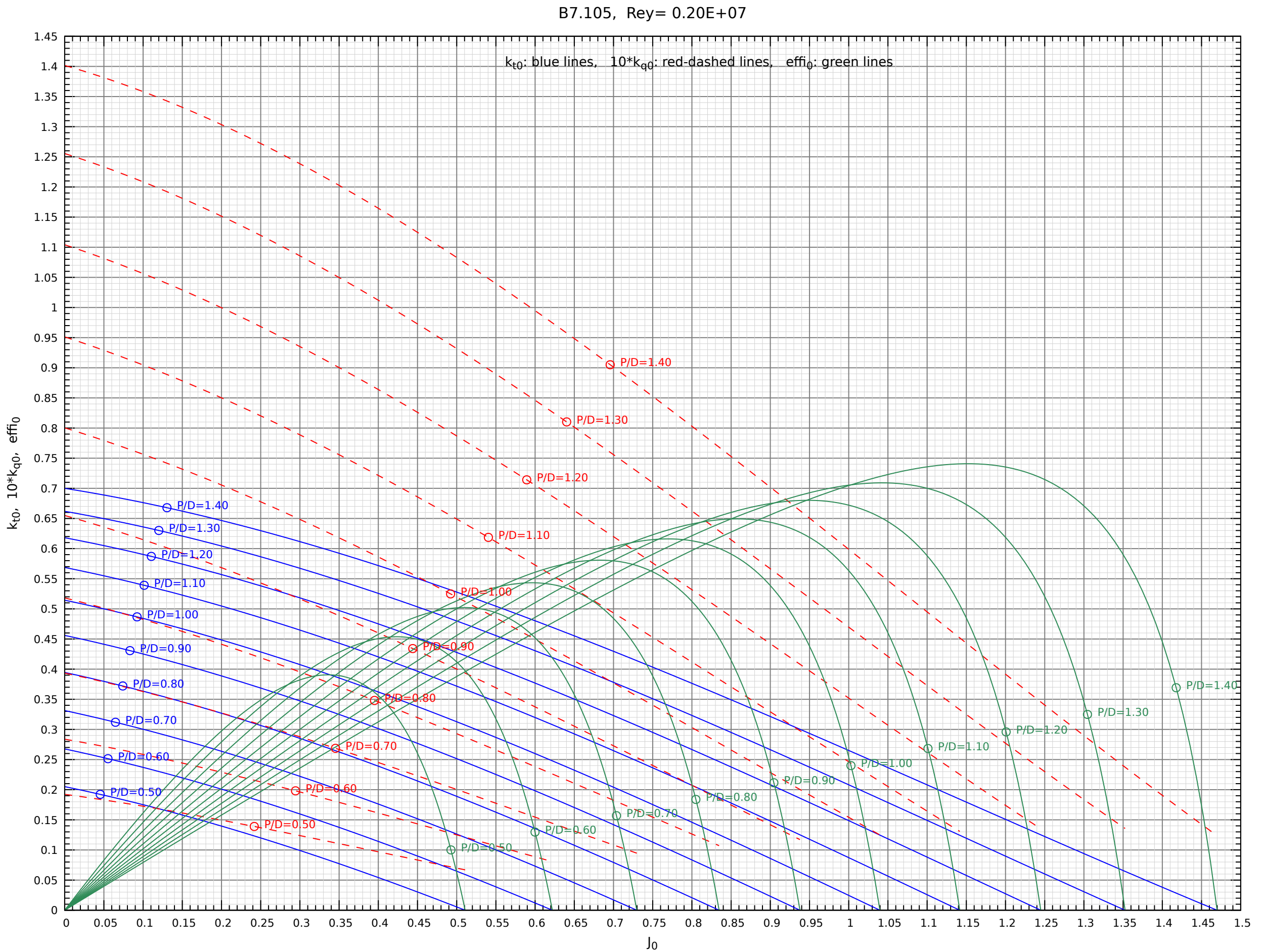
B7.105, Rey= 0.20E+07
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
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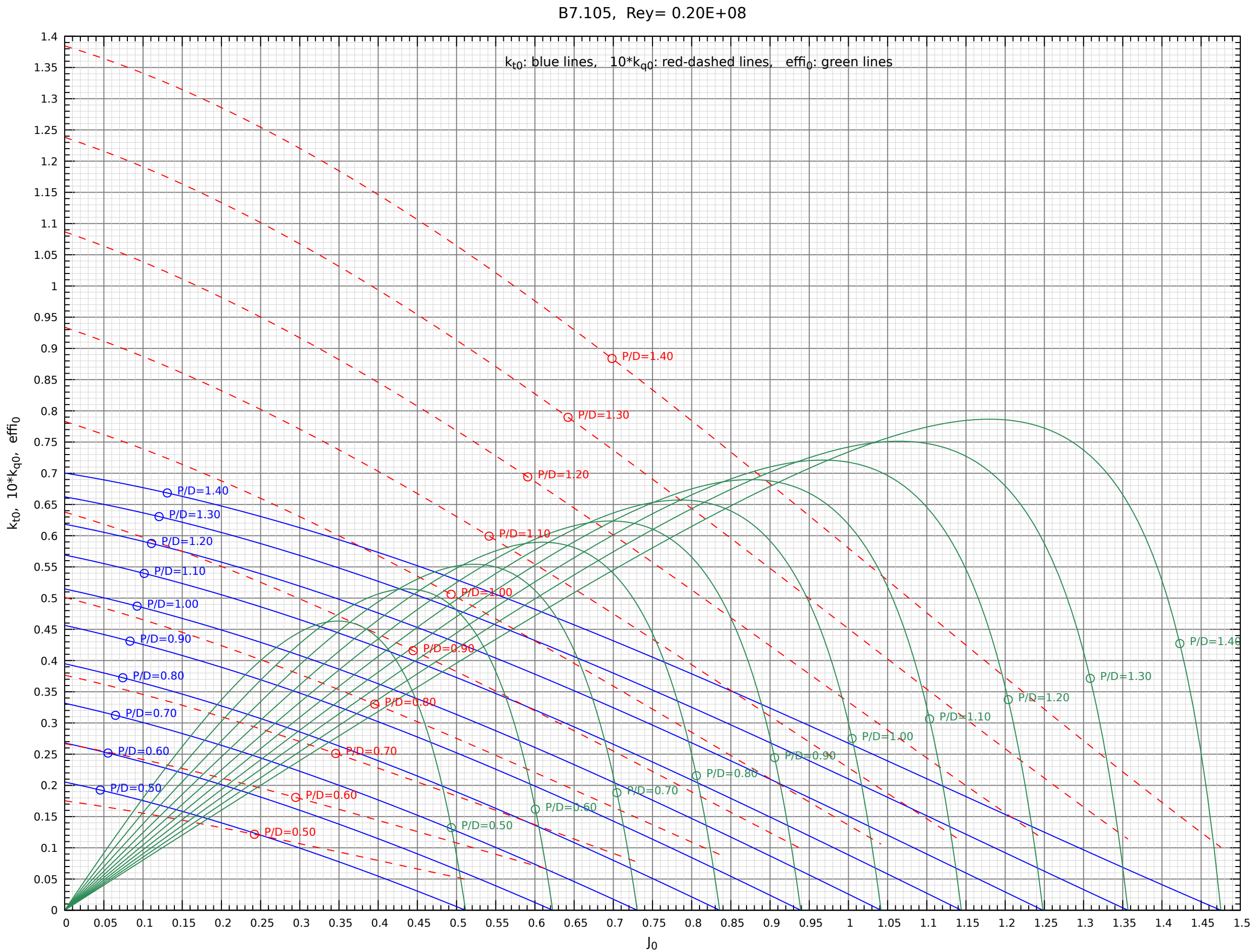
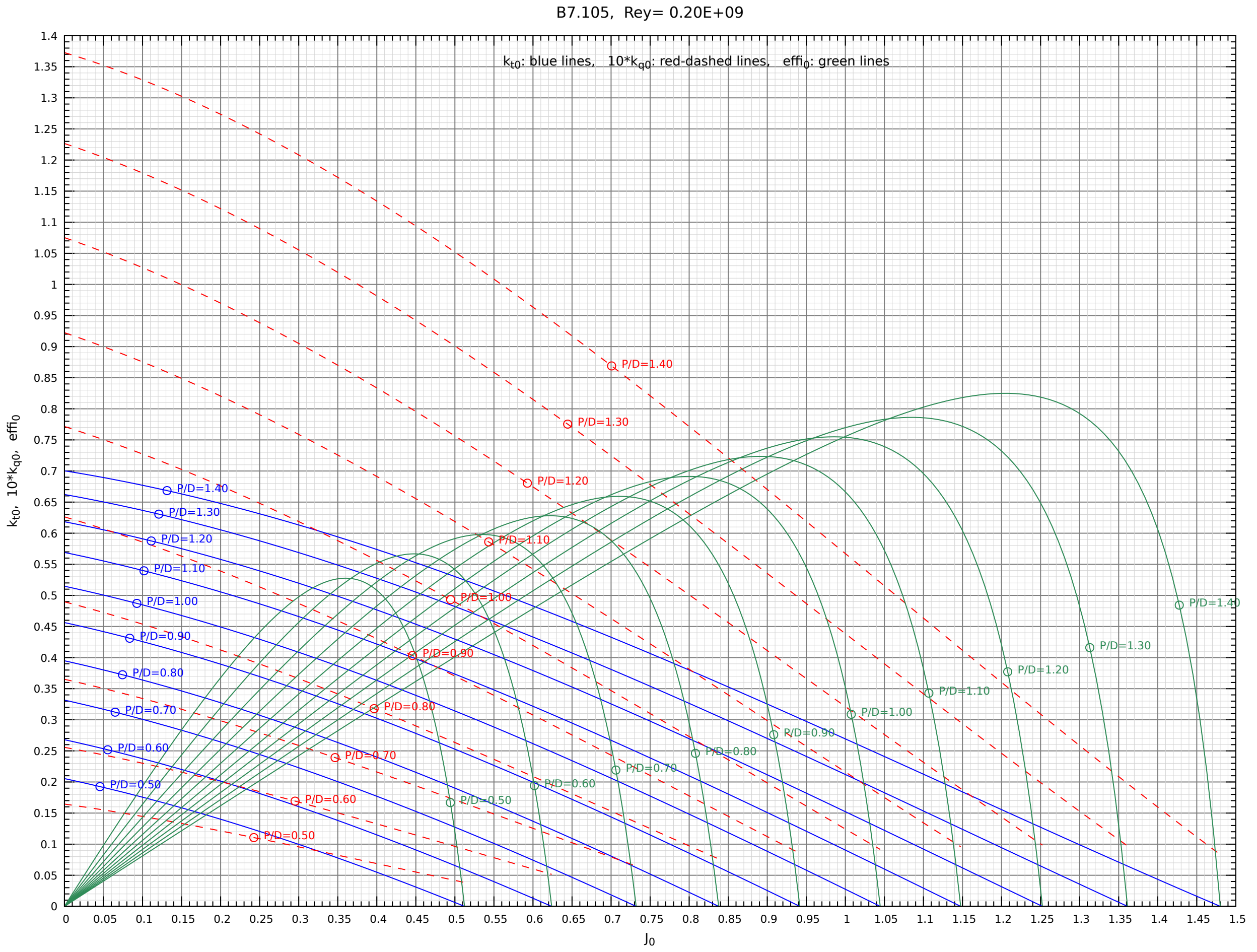
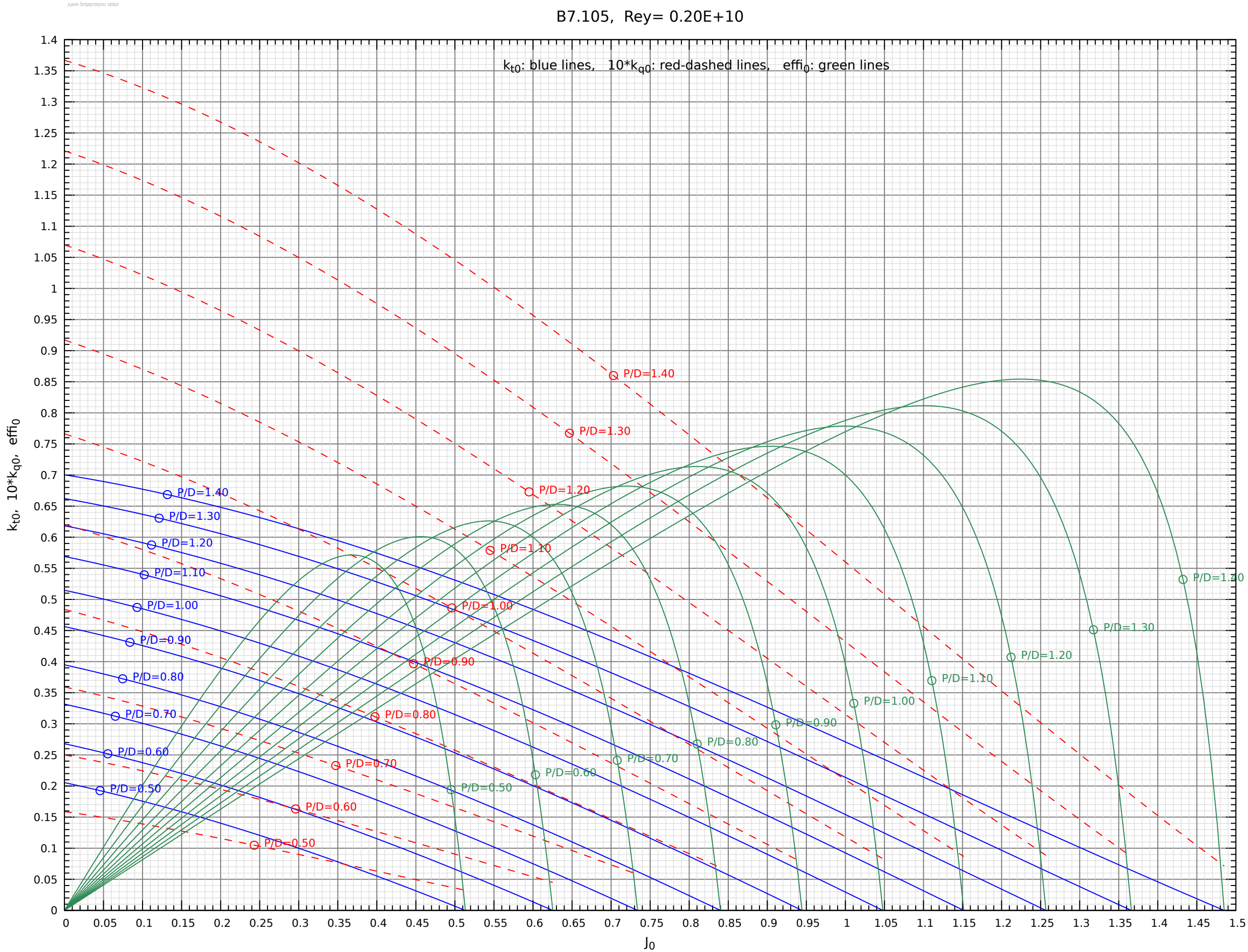

B7.105, Rey= 0.20E+08
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.105, Rey= 0.20E+09
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50


B7.105, Rey= 0.20E+10
k_{t0}: blue lines, $10*k_{q0}$: red-dashed lines, $effi_0$: green lines
k_{t0}, $10*k_{q0}$, $effi_0$
J_0
P/D=1.40
P/D=1.30
P/D=1.20
P/D=1.10
P/D=1.00
P/D=0.90
P/D=0.80
P/D=0.70
P/D=0.60
P/D=0.50