

Rachunek operatorowy Laplace'a.

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1. Znajdź oryginał:

(a) $F(s) = \frac{1}{7-s+s^2}$

(b) $F(s) = \frac{s}{(s^2+1)^2}$

(c) $F(s) = \frac{4s+2}{s(s+1)(s+2)}$

(d) $F(s) = \frac{s+2}{s+1} s^3 - 1$

(e) $F(s) = \frac{s+2}{(s+1)(s-2)(s^2+4)}$

(f) $F(s) = \frac{e^{-s}}{s^2-2s+5}$

(g) $F(s) = \frac{e^{-3s}}{(s+1)^2}$

(h) $F(s) = \frac{e^{-s}}{s^2} + \frac{2e^{-2s}}{s^3} + \frac{6e^{-3s}}{s^4}.$

2. Za pomocą rachunku operatorowego znajdź całkę szczególną:

(a) $x'''(t) + 2x''(t) + 5x'(t) = 0, x(0) = -1, x'(0) = 2, x''(0) = 0$

(b) $x''(t) + x'(t) = \cos t, x(0) = 2, x'(0) = 0$

(c) $x''(t) - 6x'(t) + 9x(t) = 0, x'(0) = 0, x(0) = 1$

(d) $x''(t) + 4x(t) = 2 \cos t \cos 3t, x(0) = x'(0) = 0$

(e) $x''(t) + x'(t) + x(t) = te^t, x(0) = x'(0) = 0$

(f) $x'''(t) - x'(t) = e^{-t}, x(0) = x'(0) = 0, x''(0) = 1.$